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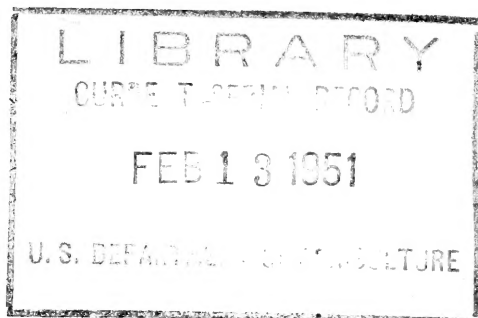


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**MANUAL OF THE GRASSES
OF THE UNITED STATES**

By
A. S. HITCHCOCK

Second Edition
Revised by
AGNES CHASE



Division of Plant Exploration and Introduction
Bureau of Plant Industry, Soils, and Agricultural Engineering
Agricultural Research Administration

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MANUAL OF THE GRASSES OF THE UNITED STATES

By the late A. S. HITCHCOCK,¹ *principal botanist, Division of Plant Exploration and Introduction*; second edition revised by AGNES CHASE, *formerly senior botanist and later collaborator, Division of Plant Exploration and Introduction, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, and research associate, United States National Museum, Smithsonian Institution*

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INTRODUCTION

Of all the plants of the earth the grasses are of the greatest use to the human race. To the grasses belong the cereals, sugarcane, sorghum, and the bamboos; and, since they furnish the bulk of the forage for domestic animals, the grasses are also the basis of animal industry.

USES OF GRASSES

The grasses furnish the principal breadstuffs of the world and a large part of the food of domestic animals; they are also used in the industrial arts and extensively as greensward and ornamentals in parks and gardens.

FOOD GRASSES

The most important food plants for the human race are the cereals, including wheat, corn (maize), rice, barley, rye, oats, and many kinds of grain sorghums. For primitive peoples the seed of certain other grasses, such as pearl millet, common millet, broomcorn millet, Japanese millet, and African millet (ragi), have played an important role. The seeds of the cereals are also extensively used as feed for domestic animals.

FORAGE GRASSES

Forage grasses are used for hay, pasturage, soiling, and silage.

HAY GRASSES

The grasses together with clovers and alfalfa are the basis of permanent

¹ Died December 16, 1935.

Sand-binding grasses in addition are able to grow up through the deepening sand. The most effective sand binders for seacoast drifting sand are the European beachgrass (*Ammophila arenaria*) and its American relative (*A. breviligulata*). The dunes of the Netherlands, southwestern France, northern and western Denmark, and other parts of Europe and areas on Cape Cod are planted with beachgrass. These fixed dunes act as barriers, protecting the land behind them. The land now occupied by Golden Gate Park, once an area of drifting sand, was first held in place with beachgrass and later planted to shrubs and trees. *Calamovilfa longifolia* and *Redfieldia flexuosa* are effective native sand binders on sand dunes of the interior.

Grasses with strong rhizomes are used to hold the sides of cuts and banks and to protect them against erosion. Bermuda grass in the South and quackgrass (*Agropyron repens*) in the North have been used successfully for this purpose. Rhizome-bearing species of *Elymus* and *Agropyron* have been used in the Northwest to hold railroad embankments along the Columbia River.

Shallow-water marshes and lagoons are in many places being converted into dry land by native plants growing therein that accumulate soil and gradually raise the level of the bottom. Grasses, especially species of *Spartina* and *Phragmites*, play an important part in the process. Artificial plantings of *Spartina townsendii* have been used with great success in the south of England, northern France, and in parts of the Netherlands to convert marshes and mud flats along the coast into dry land.

GRASSES FOR LAWNS AND GOLF COURSES

The lawn is a most important part of a well-planned landscape, park, or garden. For the humid regions of the Northern States, Kentucky bluegrass, also used for pasture, is the best-known lawngrass. Rough bluegrass (*Poa trivialis*) is often used as a lawn-

grass in shady places. In the Southern States Bermuda grass takes the place of bluegrass. Two other species are prominent as grasses for lawns and putting greens, creeping bent (*Agrostis palustris*) and colonial bent (*A. tenuis*). Along southern coasts St. Augustine grass (*Stenotaphrum secundatum*) and centipede grass (*Eremochloa ophiuroides*) are planted, being propagated by cuttings. Some of the fescue grasses are used in mixtures for lawns. These are red fescue (*Festuca rubra*), sheep fescue (*F. ovina*), hard fescue (*F. ovina* var. *duriuscula*), and shade fescue (*F. rubra* var. *heterophylla*).

ORNAMENTAL GRASSES

Among typical ornamentals the plume-grasses, giant reed (*Arundo donax*), Ravenna grass (*Erianthus ravennae*), eulalia (*Miscanthus sinensis*), and pampasgrass (*Cortaderia selloana*) are the most popular for parks and large areas. Dwarf bamboo (*Bambusa multiplex*) is used for hedges in the South, and the smaller species of *Phyllostachys* for masses of evergreen foliage. *Pseudosasa japonica*, an aggressively spreading hardy bamboo, is rather common in parks. Fountain grass (*Pennisetum setaceum*) and blue fescue (*Festuca ovina* var. *glauca*) are used for borders. Ribbon grass (*Phalaris arundinacea* var. *picta*) is a familiar grass in old gardens. Basket grass (a variegated form of *Oplismenus hirtellus*) will fall in long festoons from hanging baskets.

DISTRIBUTION OF GRASSES

One of the most widely distributed of the families of flowering plants, the grasses are found over the land surface of the globe, in marshes and in deserts, on prairies and in woodland, on sand, rocks, and fertile soil, from the Tropics to the polar regions and from sea level to perpetual snow on the mountains.

The different grasses, like other kinds of plants, thrive best under certain conditions of soil, moisture, temperature, exposure, and altitude.

The conditions under which a plant normally grows is its habitat. Some species are narrowly restricted in their habitat—being found only in sand or on rocks, in salt marshes or on alpine summits, for example, whereas others are tolerant of wide variations of habitat. Red fescue (*Festuca rubra*) is an example of wide distribution of a species tolerant of a variety of habitats. It is found from the Arctic regions south at low altitudes to Georgia and central California and in the mountains farther south, and from the seacoast marshes to mountain tops.

Each species is found growing over a rather definite geographic area, but within this area it is confined to its particular habitat.

In mountain regions altitude is an important factor in modifying range, each species thriving within certain limits of altitude. Species found at high altitudes in one range of mountains may reappear at about the same altitude on other ranges. Certain grasses growing at low levels in the north are found in the mountains and at increasingly higher elevations southward.

The geographic range is of importance and is given in some detail for each species in the manual. The range as given is based upon the study of a vast amount of material, both in the herbarium and in the field. For convenience in keeping the records of distribution a series of outline maps, one for each species or variety, has been prepared in the grass herbarium of the United States National Herbarium. The known range of each species is indicated upon these maps by a dot on each State from which specimens are in the herbarium or have been examined by the author. (A few extensions of range have been found since the maps were engraved. These are included in the text.) Local floras, lists, and records of distribution have been checked, and efforts have been made to verify the records that seemed to indicate an extension of range. Other

herbaria have been visited or have lent specimens, and many correspondents have submitted specimens for verification. No additions have been made without a study of the specimens. But it must be borne in mind that dots (representing specimens) necessarily indicate where the different specimens have been collected, therefore where botanists have been. Absence of a dot in a state does not necessarily mean the species in question does not grow in that state.

The ranges of native species are usually fairly well defined and continuous. A species of the Coastal Plain extends, for example, from New Jersey to North Carolina or from Virginia to Florida and Texas, without a conspicuous break. Mountain plants extend along mountain ranges where similar conditions prevail. Some species have in the main a continuous range but are found also in isolated and distant localities. *Bouteloua hirsuta* extends over the Great Plains east to Wisconsin and Louisiana, and again occurs abundantly and apparently native on Sanibel Island, Fla. Some Coastal Plain species appear again around the head of Lake Michigan. In these cases it is probable that the species do not occur in the intermediate areas.

Certain arctic or northern species also show interrupted range, being found within the limits of the United States only on isolated mountain tops. The arctic grass, *Phippsia algida*, for example, is known within the United States only from alpine summits in Colorado. What appear to be interrupted ranges along the northern or southern borders are mostly due to extensions into this country from the main ranges in Canada or Mexico.

The distribution of recently introduced species is often very erratic. A single introduction may maintain itself or even spread considerably for several years before coming to the notice of botanists. Introduced species often travel rapidly along railroads by means of cattle cars, or

they spread as impurities in the seed of crop plants. That seeds may travel great distances through the air has been shown by experiments in which airplanes have collected seeds, insects, and other objects at varying heights in the atmosphere. For example, spikelets of *Paspalum dilatatum* and *P. urvillei* were taken at altitudes up to 5,000 feet in Louisiana.

Grasses introduced into cultivation may spread or "escape" from cultivation and become established over wide areas. Kentucky bluegrass (*Poa pratensis*) and the ryegrasses (*Lolium perenne* and *L. multiflorum*) are familiar examples. Johnson grass is an excellent forage grass, but if it escapes into cultivated fields may become a troublesome weed.

Other cultivated grasses, such as the grains, frequently spread from fields but are unable to maintain themselves for long. *Eulalia* (*Miscanthus sinensis*) has been cultivated for ornament in the eastern part of the United States for many years. Recently it has shown a tendency to spread by seed. It is now becoming a nuisance in some localities because of its aggressiveness in old fields.

MORPHOLOGY OF GRASSES

The organs of grasses undergo many modifications or departures from the usual or typical structure. A knowledge of the structure and modifications of the organs, especially of the parts of the spikelet, is essential for the interpretation of relationships.

VEGETATIVE ORGANS

In size grasses vary from minute species only 2 or 3 cm. high to the giant bamboos 30 m. tall. The vegetative organs, however, consist, in all cases, of root, stem, and leaves. A single unbranched stem with the attached leaves is a shoot.

ROOT

The roots of grasses are fibrous with little modification. The primary

root persists only a short time after germination, its place being taken by secondary roots produced from the nodes of the young culm. Besides the original root system at the base of the plant, secondary roots are often formed from nodes above the ground as in maize (prop roots), or from the nodes of creeping culms (rhizomes or stolons). Roots are never produced from the internodes of the culms.

STEM

The jointed stem of a grass, called a culm, is made up of a series of nodes and internodes. The internode is hollow (wheat), or solid (maize); the node or joint is always solid. The culm may branch at the base as in wheat (stools) or above the base as in *Muhlenbergia*. Creeping culms, modified for propagation, may be below ground (rhizomes) or above ground (stolons). The lower internodes may thicken into corms (timothy, species of *Melica*, *Arrhenatherum elatius* var. *bulbosum*), sometimes referred to as bulbs. Perennial grasses may form a sod or mass of individuals by means of rhizomes or stolons, or they may form a crown or tuft by the continual formation of upright branches within the lower sheaths.

LEAF

The leaves are borne on the culm in two ranks, one at each node. The leaf consists of sheath and blade. The sheath envelops the culm above the node, the margins overlapping (open) or infrequently united into a cylinder for a part or a whole of the distance to the summit (closed).

The blades are typically flat, narrow, and sessile. In dry regions they are usually involute or convolute; in tropical shade they are often comparatively short and wide (lanceolate, ovate, or elliptic); in most of the bamboos they are narrowed into a short petiole articulate with the sheath.

Some grasses (especially the *Hordeae*) bear, one on either side at the

base of the blade, appendages known as auricles. At the junction of the blade and sheath on the inside is a membranaceous or ciliate appendage called the ligule. The region on the back of the leaf at the junction of the sheath and blade is called the collar.

PROPHYLLUM

At the point where a branch shoot originates from a main shoot (in the axil of a sheath), there is produced on the side next to the parent shoot a 2-keeled organ (the first leaf of the shoot) called the prophyllum. At first the prophyllum completely covers the bud but later opens as the shoot develops. The organ is usually concave between the keels toward the parent shoot but clasps the new shoot by its margins.

FLORAL ORGANS

The floral organs of all flowering plants are modified shoots. The flowers of grasses consist of stamens and pistils with no floral envelopes or perianth, except as they are represented by the lodicules.

THE INFLORESCENCE

The unit of the grass inflorescence is the spikelet. The spikelets are nearly always aggregated in groups or clusters which constitute the inflorescence. The tassel of maize, the spike or head of wheat or timothy, and the panicle of the oat or bluegrass are examples of inflorescences.

The simplest inflorescence is the raceme, in which the spikelets are pediceled along an axis. The typical raceme, as in *Pleuropogon*, is rare in grasses. Modified spikelike racemes are characteristic of *Paspalum*, *Digitaria*, and allied genera, in which the spikelets are paired and short-pedicellate, and of most Andropogoneae, in which the spikelets are paired, one sessile, the other pedicellate. The inflorescences of the groups mentioned may best be considered as specialized panicles.

The spike differs from the raceme in having sessile spikelets. In the Hordeae the spikes are symmetrical, in the Chlorideae they are one-sided.

The panicle is the commonest kind of grass cluster. In this the spikelets are pediceled in a branched inflorescence. The panicle may be open or diffuse, as in *Panicum capillare*, or contracted, as in millet. Compact panicles, especially if cylindric like timothy, are called spikelike panicles.

Numerous small inflorescences may be aggregated into a large or compound inflorescence. Many Andropogoneae have compound inflorescences, for example, the broomsedge (*Andropogon virginicus*).

Panicles often expand at the time of flowering (anthesis). Such expansion or spreading of the branches and branchlets is brought about by the swelling of motor organs (pulvini) in the axils of the inflorescence.

Sometimes the ultimate branches of an inflorescence are sterile instead of bearing spikelets. The sterile branchlets of *Setaria*, *Pennisetum*, and *Cenchrus* are modified into bristles around the spikelets.

THE SPIKELET

A typical spikelet consists of a short axis (rachilla) on which the flowers are borne in the axils of 2-ranked imbricate bracts. The spikelet is, therefore, a reduced modified shoot in which the rachilla is a stem bearing at each node a reduced leaf (bract). The flowers are secondary reduced shoots borne in the axils of the bracts, the first bract (palea) on the secondary shoot being a modified prophyllum and the stamens and pistil being modified leaves or bracts. The bracts of the lowest pair on the rachilla, being always empty, are distinguished as glumes. The succeeding bracts are called lemmas (flowering glumes of some authors). The glumes and lemmas represent the sheath of the leaves, the blades not developing (in proliferous spikelets the parts are partially developed into typical

leaves). The lemma, palea, and included flower are called the floret. The branchlet bearing the spikelet is the pedicel.

The spikelet may be reduced to a single floret (Agrostideae), sometimes with a prolongation of the rachilla behind, as in *Calamagrostis*. In *Andropogon* a fertile spikelet is paired with a sterile one in which the pistil or both pistil and stamens are wanting. The upper florets of the spikelet are often reduced in Festuceae, and the lower lemmas may be empty in some genera (*Uniola*, *Blepharidachne*). In *Melica* and *Chloris* the upper florets may be reduced and form a club-shaped body. In *Phalaris* there is one fertile floret with a pair of sterile florets below, each reduced to a small appressed scale. In *Lamarckia* and *Cynosurus* there are prominent sterile spikelets mixed with the fertile ones.

In Paniceae the spikelet has a perfect terminal floret and below this a sterile floret, consisting of a sterile lemma similar to the glumes, either empty or with a hyaline palea or sometimes with a staminate flower.

* In a few grasses (*Amphicarpum*, *Chloris chloridea*) there are, in addition to the usual inflorescence above ground, cleistogamous spikelets borne on underground culms.

RACHILLA

The axis bearing the florets, the rachilla, usually disarticulates between the florets when the spikelet is more than 1-flowered. In many species of *Eragrostis* it is continuous, usually bearing the persistent paleas, after the remainder of the florets have fallen. When the rachilla disarticulates the break is usually just below the florets so that the rachilla joint remains attached as a little stipe back of the palea. The disarticulation is near the middle of the internode in *Trichoneura* and *Festuca subuliflora*. The rachilla disarticulates just above the floret in *Phragmites*, the rachilla remaining as a plumose stipe below it. The rachilla is short-villous or pilose

in many genera of Aveneae (the callus of the floret often pilose also).

In some genera with 1-flowered spikelets (*Calamagrostis*, *Cinna*, *Cynodon*) the rachilla is prolonged behind the floret as a slender, often villous, stipe or bristle, and in several genera with several-flowered spikelets (*Koeleria*, *Poa*) it is prolonged, beyond the uppermost floret.

GLUMES

The glumes are usually similar in shape and texture, the first often smaller and with fewer nerves. Rarely the first glume is longer than the second (species of *Aristida*). The first may be much reduced or wanting (*Axonopus*, *Paspalum*, *Digitaria*). Rarely both glumes are wanting (*Leersia*, *Reimarochloa*). In *Eriochloa* the first glume is reduced or wanting, the first rachilla joint being a hard ring below the spikelet. In Andropogoneae the first glume is usually indurate, sometimes strongly so. In some Hordeae the glumes are bristle-like.

LEMMAS

The lemmas in the more primitive grasses are typically similar to the glumes but may be variously modified. In *Panicum* the fertile lemma is much harder than the glumes; in Andropogoneae they are much thinner than the glumes, often hyaline. The indurate cylindric lemma of *Stipa* and *Aristida* bears a sharp callus at base, formed by the oblique articulation with the rachilla.

PALEA

The palea is mostly 2-keeled and often concave between the keels. It is homologous with the prophyllum. Sometimes the 2 nerves of the palea are so close together as to appear like a single nerve (*Cinna*); sometimes the 2 nerves are marginal and widely separated as in rice. The keels may be ciliate (*Eragrostis*), bearded (*Triplasis*), or winged (*Pleuropogon*). The palea is much reduced or wanting in

species of *Agrostis*. Usually the palea falls with its lemma, but in many species of *Eragrostis* it persists upon the rachilla after the fall of the lemma.

FLOWER

The flower proper consists of the stamens and pistil. The stamens are usually 3 but may be 1 to 6, rarely more. The slender filaments bear 2-celled anthers which are basifixed but so deeply sagittate as to appear versatile. The pistil is 1-celled, with 1 ovule; the styles are usually 2 but may be 1 or 3; the stigmas may arise from a single style or directly from the ovary. The style of *Zea* is greatly elongated and stigmatic over much of the exerted surface.

The lodicules are small organs found at the base of the flower outside the stamens. There are usually 2, rarely 3, the function of which is to open the floret at anthesis by their turgidity. They probably represent much reduced divisions of a perianth.

Typically the grasses are adapted to cross-pollination, but many species are cleistogamous in part. The axillary inflorescences of some species (*Panicum clandestinum* and allies, *Leersia oryzoides*) are enclosed in the sheaths and are self-pollinated. The florets of wheat expand for only a short time, when cross-pollination may take place, but for the most part are self-pollinated.

The fruit of the grasses is usually a caryopsis, in which the single seed is grown fast to the pericarp, forming a seedlike grain. In a few genera (*Sporobolus*, *Eleusine*), the seed is free from the pericarp. The caryopsis may be free from the lemma and palea, as in wheat, or it may be permanently enclosed, as in the oat and in the Paniceae. The grain (caryopsis) may enlarge during ripening and greatly exceed the glumes, lemma, and palea, as in maize and *Pennisetum glaucum*.

The embryo lies on the side of the caryopsis next to the lemma, and can be easily seen as an oval depression (the "germ" of maize and wheat). The hilum is the dot or line opposite

the embryo which marks the point of attachment of the seed to the pericarp. The part of the caryopsis not occupied by the embryo is the endosperm, or nourishment for the germinating seed.

CLASSIFICATION OF GRASSES

A natural classification of plants is one in which the different kinds or species are arranged in groups according to their resemblances as shown by their structure, especially (in the grasses and other flowering plants) by the structure of their flowers. The plants of today represent a cross section of the lines of descent from countless generations that have preceded them. It is generally accepted that there has been much variation during the evolutionary process, and that all living plants are genetically connected through their lines of descent. Some of the gaps in present-day knowledge of relationship are filled by fossil remains, but relatively few of the ancestors of living plants are represented by fossils. Knowledge of the ancestry of the kinds of plants now on the globe is necessarily very incomplete. Hence, ideas of the relations of groups to each other are largely inferences based upon morphological resemblances. Those individuals which are so much alike as to appear to be of one kind, with, presumably, a common ancestor in recent geological times, are regarded as belonging to the same species. The species is the unit of classification. For convenience, species are grouped into genera and genera into families. For example, the white oak, red oak, black oak, and other kinds or species of oak belong to the oak genus (*Quercus*), all the species of which have one character in common—the fruit is an acorn. The oak genus, the beech genus, the chestnut genus, and a few allied genera are grouped together as a family.

The grass family (Gramineae or Poaceae) is one of the largest in number of genera and species, and,

among flowering plants, is probably the largest in the number of individuals and is one of the most widely distributed. Some genera, such as the bluegrasses (*Poa*), the brome-grasses (*Bromus*), and the immense genus *Panicum*, contain numerous often closely allied species. Some genera contain but a few species or only one.

When an attempt is made to classify a group of related variable species the question always arises whether there are several closely related but distinct species or a few distinct species, each of which shows great variation. It is but natural that botanists should differ in their conclusions. This explains in part the different classifications of the same group given by botanists of different periods or even of the same period. A satisfactory classification depends upon the study of abundant material both in the field and in the herbarium. By observation in the field one learns the range of variability of a species, while in the herbarium one can compare plants from different localities, interpreting the dried specimens in the light of field experience.

In the classification of variable species it is found convenient sometimes to separate variants as varieties. A variety comprises those individuals of a species that show a definite tendency to vary in a certain direction, but which are connected with the species by rather numerous intergrades. Sometimes a variety is founded on a single variation which is distinct but trivial, for example, pubescent specimens of a glabrous species. A variation supported by a distinct geographical range or even by a distinct habitat is given greater weight than is a variation found in a few individuals growing among plants of the typical form.

The study of a vast amount of material in field and herbarium during some 40 years has resulted in the recognition of relatively few varieties, the intergrades proving to be

more numerous than fairly clear-cut variants. Well-marked varieties are given a separate paragraph in the text, but are not usually given in the keys. Less well-marked varieties are given in the paragraph with the species. Many additional forms are indicated in a descriptive statement without being formally recognized as species or varieties. For example, under *Digitaria gracillima* appears, "A tall plant with * * * has been called *D. bakeri* (Nash) Fernald"; and under *Eriochloa michauxii*, "a form with * * * has been described as *E. mollis* var. *longifolia* Vasey."

The arrangement of the genera in this manual is, in general, from the simple to the complex. It is, of course, impossible to arrange all the genera in linear sequence and at the same time represent a gradual increase in complexity because plants have not developed in a single line, but have diverged in all directions, their relationships being a complex network. The highest genus of one tribe may be much more complex than the lowest genus of the next tribe above. On the average the Bambuseae seem to be the most primitive and the Tripsaceae the most complex. A grass with a spikelet consisting of glumes and several florets, the lemmas and glumes being similar and resembling bracts, is a primitive form. Grasses with spikelets in which the parts are reduced, enlarged, or much differentiated, are derived or complex forms. Derived forms may be simple from the reduction of parts and yet not be primitive. In the main the genera of grasses fall readily into a few large groups or tribes, but several genera of uncertain affinities are, for convenience, placed in the recognized tribes on artificial characters, with the hope that further study and exploration will bring to light their true relationships.

The grasses of the world (some 600 genera) have been grouped into 14 tribes, all of which are represented in the United States.

The sequence of tribes and genera in the manual with a few minor changes, is that found in *The Genera of Grasses of the United States*.²

NOMENCLATURE

The cooperative study of botany depends for progress and success on definiteness in the application of the names of plants. Research workers in all branches of botany must use the names of plants in the same sense, or serious misunderstandings will result. One of the functions of systematic botany is to determine the correct names of plants. The study of the application of plant names is nomenclature. By common consent of the botanists of the world Latin has been accepted as the language for technical plant names.

Modern nomenclature commences with the publication in 1753 of Linnaeus' *Species Plantarum* in which the binomial system of naming plants was first proposed. During the nearly 200 years following that date many thousands of plants have been described. During this time there has been a lack of uniformity in the use of names, causing much confusion and resulting in frequent changes. The same species has been described under different names at different times, and the same name has been given to different plants. This confusion has been especially embarrassing to the agriculturist, ranger, seedsmen, pathologist, entomologist, and to all others interested in plants but not familiar with nomenclature and the history of the names used.

The difference in the Latin names applied in different books to the same kind of grass is due to several causes.

(1) A species is described as new by one author without knowing that the same species had been previously described by another author. The second name is known as a synonym.

(2) An author applies a new name to a variant of a species already described. The

author recognizes the variant as a distinct species. Other botanists may consider it to be only a variety of the older species or may consider it as a variant not sufficiently distinct to be worthy of varietal rank.

(3) Authors have different concepts of the limits of genera. The genus *Triticum* was described by Linnaeus. A later botanist thought that many of the species of this genus were different enough to constitute a distinct genus, *Agropyron*, and transferred quackgrass, first described as *Triticum repens* to *Agropyron*, as *A. repens*.

(4) Authors sometimes misidentify species. Linnaeus described one of the cordgrasses as *Spartina cynosuroides*. Later, Michaux used the specific name for a different species (*Trachynotia cynosuroides*, based on *S. cynosuroides* L.) This error was corrected and the species described by Michaux was given a new name, *S. michauxiana*. Later the loan of the type of *Spartina pectinata* Link, poorly described many years earlier, shows that that name is the valid one for the species.

It will be seen that the differences in names are due in part to differences of opinion as to the generic, specific, or varietal distinctness of forms; in part to lack of knowledge as to what plants have been described previously; and in part to errors of identification.

All the preceding shows the need of rules of nomenclature. To enable users of this manual to coordinate the names published to date a synonymy has been appended in which all the names published for grasses in the United States have been arranged under the names here adopted, that is, under the oldest valid name for each species. In determining the valid names of the species the International Rules of Botanical Nomenclature have been followed. Under these rules certain generic names are conserved though they are not the earliest. The names of genera of grasses on the conserved list are as follows: *Chrysopogon*, *Tragus*, *Zoysia*, *Setaria*, *Leersia*, *Ehrharta*, *Hierochloë*, *Crypsis*, *Coleanthus*, *Corynephorus*, *Cynodon*, *Ctenium*, *Buchloë*, *Diarrhena*, *Lamarckia*, *Glyceria*, *Scolochloa*.

Certain other names of genera are used for different reasons. *Digitaria* antedates *Syntherisma* with which it is synonymous. It was proposed at the Cambridge International Botan-

² HITCHCOCK, A. S. THE GENERA OF GRASSES OF THE UNITED STATES, WITH SPECIAL REFERENCE TO THE ECONOMIC SPECIES. U.S. Dept. Agr. Bul. 772, 307 pp., illus. 1920, revised 1936.

ical Congress (and referred to a committee) that the standard species of *Holcus* be *H. lanatus* and of *Aira* be *A. praecox*, thus leaving *Sorghum* and *Deschampsia* the valid names for their respective genera.

The synonymy attempts to record all the effectively published names given to species and varieties described from the United States or known to grow in the United States. In addition many names are given that have been published as synonyms or without sufficient description (*nomina nuda*). Whether such names are included depends upon whether they have appeared in such works as the *Index Kewensis* or have some connection with effectively published names. When a species is transferred from one genus to another, a new name results. The basis of the transfer is given in each case. If the name was published as new the original published locality is given. Statements enclosed in brackets following the original locality are based upon unpublished evidence.

Forms (*formae*) are included in the synonymy so far as they have been indexed in the grass herbarium. The index includes all forms recently published in this country. Misapplied names have not been included among the synonyms but are mentioned in a paragraph at the end of the synonymy of the valid species, and then only names that have appeared in recent manuals are given. For convenience the names of the genera are arranged alphabetically and under each genus the valid names of the species are given in alphabetic order in boldface type, the synonyms of each species (in italics) being arranged chronologically under the valid name.

So far as possible the names have been confirmed or identified by examination of the types. The type of a species or variety is the specimen which an author had chiefly in mind when he wrote the original description. The type specimen determines

the application of the name. The type specimens of the early American botanists are mostly in European herbaria. The types of species described by Vasey and other botanists connected with the Department of Agriculture are mostly in the United States National Herbarium. Types not in Washington have been studied in other herbaria and photographs and drawings made of them by the agrostologists of the Department of Agriculture, or have been lent by the curators of the herbaria in which they are deposited. Through the courtesy of these curators many fragments of types have been deposited in the United States National Herbarium. A few type specimens have not been located, and doubtless in some of these cases there are no types in existence to confirm original descriptions. A relatively small number of published names still remain unidentifiable. These names are listed following the synonymy. Certain exotic species, occasionally cultivated for ornament or for trial, have been included in notes appended to the genera to which they belong. It has not been practicable in all cases to verify the application of the names on a type basis, and the species are admitted under the names they bear in cultivation.

COMMON NAMES

The common or English names of plants are often uncertain in their application, different plants bearing the same name or the same plant bearing different names in different localities. A recent work, *Standardized Plant Names*,³ recently reissued, has coordinated and standardized the common names. One of the authors of this work, Frederick V. Coville, standardized the common names of the grasses for the first edition of this Manual.

³ AMERICAN JOINT COMMITTEE ON HORTICULTURAL NOMENCLATURE. *STANDARDIZED PLANT NAMES*. Prepared by Olmsted, F. L., Coville, F. V., and Kelsey, H. P. 546 pp. Salem, Mass. 1923. (Revised by Kelsey, H. P., and Dayton, W. A. 675 pp. Harrisburg, Pa. 1942.)

SCOPE OF THE MANUAL

The manual includes descriptions of all grasses known to grow in the continental United States, excluding Alaska. There are 169 numbered genera and 1,398 numbered species. Of these, 46 genera and 156 species are introduced, mostly from the Eastern Hemisphere.

In addition to the numbered species, which may be considered permanent constituents of the flora of the United States, there are 16 genera and 120 species that are known only as ballast plants, or as waifs, or are only rarely cultivated. These appear not to be established and are mentioned, without numbers, in paragraphs appended to their nearest allies. They are not included in the keys.

The manual is based mainly on the material in the United States National Herbarium, the grass collection of which is the largest in the world, numbering more than 320,000 sheets. In addition, all the larger collections of grasses in the United States have been consulted and the curators have lent specimens for study and have aided in other ways. Many smaller collections have contributed information, especially on the ranges of species. The cooperation of the Forest Service, United States Department of Agriculture, has been invaluable. The Forest Service maintains in its Washington office a range-plant herbarium consisting of the collections made by forest officers, especially those located in western national forests and forest experiment stations. The grasses of this range-plant herbarium have been examined and have furnished important data on distribution.

Many botanists throughout the country have rendered valuable assistance in recent years by contributing specimens that have added species previously unknown from the United States, have extended ranges, and have helped to solve the position of puzzling species and varieties.⁴

Nearly all the numbered species are illustrated.⁵ About half are accompanied by a map, giving the distribution of that species in the United States.

To aid the users of this work in pronouncing the Latin names the accented syllable is indicated. The accent mark is used to show the accented syllable without reference to the length of the vowel.

GRAMINEAE (POACEAE), THE GRASS FAMILY

Flowers perfect (rarely unisexual), small, with no distinct perianth, arranged in spikelets consisting of a shortened axis (rachilla) and 2 to many 2-ranked bracts, the lowest 2 being empty (the glumes, rarely one or both obsolete), the 1 or more succeeding ones (lemmas) bearing in their axils a single flower, and, between the flower and the rachilla, a second 2-nerved bract (the palea), the lemma, palea, and flower together constituting the floret; stamens 1 to 6, usually 3, with very delicate filaments and 2-celled anthers; pistil 1, with a 1-celled 1-ovuled ovary, 2

⁴ The more important are: A. A. Beetle, from California; E. E. Berkeley, from West Virginia; H. L. Blomquist, from North Carolina; W. E. Booth, from Montana; Clair Brown, from Louisiana; V. H. Chase, from Illinois, Arkansas, and Idaho; Earl Core, from West Virginia; R. A. Darrow, from Arizona; R. J. Davis, from Idaho; Charles C. Deam and J. E. Potzger, from Indiana; H. I. Featherly, from Oklahoma; M. L. Fernald, from Northeastern States and Virginia; A. O. Garrett, from Utah; L. N. Goodding, from the Southwest; F. W. Gould, from Arizona and California; C. R. Hanes, from Michigan; H. D. Harrington, from Colorado; Bertrand Harrison, from Utah; R. F. Hoover and John Thomas Howell, from California; T. H. Kearney, from Arizona; John and Charlotte Reeder, California to Michigan; and W. A. Silveus, from Texas and other Southern States.

Jason R. Swallen, Curator, Division of Grasses, U.S. National Museum, has given valuable assistance. The bibliography is based on the catalog of grass names maintained in the Division of Grasses, this catalog being the work, over some 35 years, of Cornelia D. Niles, bibliographer. F. A. McClure, bamboo specialist, U.S. Department of Agriculture, contributed the economic notes on bamboos and has aided in the elucidation of the native species of bamboos.

⁵ The drawings illustrating the genera (previously published in the U. S. Department of Agriculture Bulletin 772, the *Genera of Grasses of the United States* . . .) and nearly half of the others were made by Mary Wright Gill; the rest were drawn by Edna May Whitehorn, Frances C. Weintraub, Leta Hughey, and Agnes Chase. The last-named made most of the spikelet drawings. In each case the specimen from which the drawing was made is cited, for example (Nash 2198, Fla.).

(rarely 1 or 3) styles, and usually plumose stigmas; fruit a caryopsis with starchy endosperm and a small embryo at the base on the side opposite the hilum.

Herbs, or rarely woody plants, with hollow or solid stems (culms) closed at the nodes, and 2-ranked usually parallel-veined leaves, these consisting of 2 parts, the sheath, enveloping the culm, its margins overlapping or sometimes grown together, and the blade, usually flat; between the 2 on the inside, a membranaceous hyaline or hairy appendage (the ligule).

The spikelets are almost always aggregated in spikes or panicles at the ends of the main culms or branches. The perianth is usually represented by 2 (rarely 3) small hyaline scales (the lodicules) at the base of the flower inside the lemma and palea. The grain or caryopsis (the single seed and the adherent pericarp) may be free, as in wheat, or permanently enclosed in the lemma and palea, as in the oat. Rarely the seed is free from the pericarp, as in species of *Sporo-*

bolus and *Eleusine*. The culms of bamboos are woody, as are also those of a few genera, such as *Olyra* and *Lasiacis*, belonging to other tribes. The culms are solid in our species of the tribes Tripsaceae and Andropogoneae and in several other groups. The margins of the sheaths are grown together in some species of *Bromus*, *Danthonia*, *Festuca*, *Melica*, *Glyceria*, and other genera.

The parts of the spikelet may be modified in various ways. The first glume, and more rarely also the second, may be wanting. The lemmas may contain no flower, or even no palea, or may be reduced or rudimentary. Rarely, as in species of *Agrostis* and *Andropogon*, the palea is obsolete.

The division of the family into two subfamilies is somewhat artificial. The tribes Zoysieae, Oryzeae, Zizanieae, and especially Phalarideae, do not fall definitely into either of the recognized subfamilies. They are placed as indicated largely for convenience.

DESCRIPTIONS OF THE SUBFAMILIES AND KEYS TO THE TRIBES

SUBFAMILY 1. FESTUCOIDEAE

Spikelets 1- to many-flowered, the reduced florets, if any, above the perfect florets (except in Phalarideae; sterile lemmas below as well as above in *Ctenium*, *Uniola*, and *Blepharidachne*); articulation usually above the glumes; spikelets usually more or less laterally compressed.

Key to the tribes of Festucoideae

Plants woody, the culms perennial. Spikelets several-flowered..... 1. BAMBUSEAE (p. 27)

Plants herbaceous, the culms annual (somewhat woody and persistent in *Arundo*).

Spikelets with 2 (rarely 1) staminate, neuter, or rudimentary lemmas unlike and below the fertile lemma; no sterile or rudimentary floret above..... 8. PHALARIDEAE (p. 547)

Spikelets without sterile lemmas below the perfect floret (or these rarely present and like the fertile ones, a dissimilar pair below and a rudimentary floret above in *Blepharidachne*).

Spikelets unisexual, falling entire, 1-flowered, terete or nearly so.

10. ZIZANIEAE (p. 561)

Spikelets perfect (rarely unisexual but then not as above), usually articulate above the glumes.

Spikelets articulate below the glumes, 1-flowered, very flat, the lemma and palea about equal, both keeled. Glumes small or wanting..... 9. ORYZEAE (p. 556)

Spikelets articulate above the glumes (rarely below, but the glumes, at least one, well developed).

Spikelets 1-flowered (or the staminate 2-flowered) in groups (short spikes) of 2 to 5 (single in *Zoysia*), the groups racemose along a main axis, falling entire; lemma and palea thinner than the glumes..... 6. ZOYSIEAE (p. 482)

Spikelets not as above.

Spikelets sessile on a usually continuous rachis (short-pedicellate in *Leptochloa*

and *Trichoneura*; the rachis disarticulating in *Monerma*, *Parapholis*, *Hordeum*, *Sitanion*, and in a few species of allied genera. See also *Brachypodium* in *Festuceae*.)

Spikelets on opposite sides of the rachis; spike terminal, solitary.

3. HORDEAE (p. 230)

Spikelets on one side of the rachis; spikes usually more than 1, digitate or racemose.....

7. CHLORIDEAE (p. 491)

Spikelets pedicellate in open or contracted, sometimes spike-like, panicles, rarely racemes.

Spikelets 1-flowered (occasionally some of the spikelets 2-flowered in a few species of *Muhlenbergia*).....

5. AGROSTIDEAE (p. 313)

Spikelets 2- to many-flowered.

Glumes as long as the lowest floret, usually as long as the spikelet (sometimes shorter in *Sphenopholis*); lemmas awned from the back (spikelets awnless in species of *Trisetum*, *Koeleria*, *Sphenopholis*, and *Schismus*).

4. AVENEAE (p. 280)

Glumes shorter than the first floret (except in *Dissanthelium* with long rachilla joints, and in *Tridens strictus*); lemmas awnless or awned from the tip or from a bifid apex.....

2. FESTUCEAE (p. 31)

SUBFAMILY 2. PANICOIDEAE

Spikelets with 1 perfect terminal floret (disregarding those of the few monoecious genera and the staminate and neuter spikelets) and a sterile or staminate floret below, usually represented by a sterile lemma only, 1 glume sometimes (rarely both glumes) wanting; articulation below the spikelets, either in the pedicel, in the rachis, or at the base of a cluster of spikelets, the spikelets falling entire, singly, in groups, or together with joints of the rachis; spikelets, or at least the fruits, more or less dorsally compressed.

Key to the tribes of Panicoideae

Glumes membranaceous, the sterile lemma like the glumes in texture.

Fertile lemma and palea thinner than the glumes. Sterile lemma awned from the notched summit.....

11. MELINIDEAE (p. 569)

Fertile lemma and palea indurate or at least firmer than the glumes.

12. PANICEAE (p. 569)

Glumes indurate; fertile lemma and palea hyaline or membranaceous, the sterile lemma like the fertile one in texture.

Spikelets unisexual, the pistillate below, the staminate above, in the same inflorescence or in separate inflorescences.....

14. TRIPSACEAE (p. 789)

Spikelets in pairs, one sessile and perfect, the other pedicellate and usually staminate or neuter (the pedicellate one sometimes obsolete, rarely both pedicellate). Lemmas hyaline.....

13. ANDROPOGONEAE (p. 737)

DESCRIPTIONS OF THE TRIBES AND KEYS TO THE GENERA

TRIBE 1. BAMBUSEAE

Culms woody, perennial, usually hollow; spikelets 2- to several-flowered, in panicles or racemes, or in close heads or fascicles; often 1 or more sterile lemmas at base of spikelet; lemmas usually awnless; blades usually articulated with the sheath, flat, rather broad. Only one genus, *Arundinaria*, is native within our limits. Several species of this and other genera are cultivated in the Southern States.

TRIBE 2. FESTUCEAE

Spikelets more than 1-flowered, usually several-flowered, in open, narrow, or sometimes spike-like panicles (rarely in racemes); lemmas awnless or awned from the tip, rarely from between the teeth of a bifid apex; rachilla usually disarticulating above the glumes and between the florets.

A large and important tribe, mainly inhabitants of the cooler regions. The lemma is divided into several awns in *Pappophorum* and its allies, is deeply 2-lobed in *Triplasis* and in a few species of *Tridens*, 3-lobed in *Blepharidachne*,

several-toothed in *Orcuttia*, and slightly 2-toothed in *Bromus* and in a few other genera, the awn, when single, arising from between the teeth. The paleas are persistent upon the continuous rachilla in many species of *Eragrostis*. *Scleropogon*, *Monanthochloë*, *Distichlis*, *Hesperochloa* and a few species of *Poa* and *Eragrostis* are dioecious. *Gynerium*, *Cortaderia*, *Arundo*, *Phragmites*, and *Neyraudia* are tall reeds. In *Blepharidachne* there is a pair of sterile florets at the base of the single fertile floret, and a rudiment above. In some species of *Melica* there is, above the fertile florets, a club-shaped rudiment consisting of 1 or more sterile lemmas. In *Uniola* there are 1 to 4 sterile lemmas below the fertile ones. In *Melica imperfecta* and *M. torreyana* there may be only 1 perfect floret.

Key to the genera of Festuceae

- 1a. Plants dioecious, (sometimes monoecious), the sexes very dissimilar, the pistillate lemmas with 3 long twisted divergent awns, the staminate lemma awnless or mucronate.
 41. *SCLEROPOGON*.
- 1b. Plants with perfect flowers, or, if dioecious, the sexes not dissimilar in appearance.
 - 2a. Lemmas divided at the summit into 5 to several awns or awnlike lobes.
 - Awnlike lobes 5. Inflorescence an erect raceme or simple panicle..... 36. *ORCUTTIA*.
 - Awns 9 or more.
 - Awns unmixed with awned teeth; all the florets falling attached, their awns forming a pappuslike crown, the lower 1 to 3 fertile; panicles narrow.
 - Spikelets 3-flowered, the first floret fertile; awns 9, plumose, equal.
 40. *ENNEAPOGON*.
 - Spikelets 4- to 6-flowered, the lower 1 to 3 fertile; awns numerous, not plumose, unequal..... 39. *PAPPOPHORUM*.
 - Awns mixed with awned teeth; florets not falling attached, the rachilla disarticulating between them; panicles somewhat open..... 38. *COTTEA*.
 - 2b. Lemmas awnless, with a single awn, or, if with 3, the lateral awns minute.
 - 3a. Tall stout reeds with large plumelike panicles. Lemmas or rachilla with long silky hairs as long as the lemmas.
 - Leaves crowded at the base of the culms..... 27. *CORTADERIA*.
 - Leaves distributed along the culms.
 - Lemmas naked. Rachilla hairy..... 28. *PHRAGMITES*.
 - Lemmas hairy.
 - Rachilla naked..... 26. *ARUNDO*.
 - Rachilla hairy..... 29. *NEYRAUDIA*.
 - 3b. Low or rather tall grasses, rarely more than 1.5 m. tall.
 - 4a. Plants dioecious, perennial.
 - Plants densely tufted, rather coarse, erect from short rhizomes; lemmas scabrous; grasses of dry mountain slopes..... 11. *HESPEROCHLOA*.
 - Plants not densely tufted, spreading by stolons or extensively creeping rhizomes; lemmas glabrous; grasses of salt or alkaline soil.
 - Plants low, stoloniferous; spikelets obscure, scarcely differentiated from the short crowded rigid leaves..... 20. *MONANTHOCHLOË*.
 - Plants erect from creeping rhizomes; spikelets in narrow simple exerted panicles.
 21. *DISTICHLIS*.
 - 4b. Plants not dioecious (except in a few species of *Poa* with villous lemmas and in an annual species of *Eragrostis*).
 - 5a. Spikelets of two forms, sterile and fertile intermixed. Panicle dense, somewhat one-sided.
 - Fertile spikelets 2- or 3-flowered; sterile spikelets with numerous rigid awn-tipped lemmas; panicle dense, spikelike..... 24. *CYNOSURUS*.
 - Fertile spikelets with 1 perfect floret, long-awned; sterile spikelets with many obtuse sterile lemmas; panicle branchlets short, nodding.... 25. *LAMARCKIA*.
 - 5b. Spikelets all alike in the same inflorescence.
 - 6a. Lemmas 3-nerved, the nerves prominent, often hairy.
 - 7a. Inflorescence a few-flowered head or capitate panicle overtopped by the leaves or partly concealed in them. Lemmas toothed or cleft; low plants of the arid regions.
 - Inflorescence hidden among the sharp-pointed leaves, not woolly; plants annual (*Chlorideae*)..... 114. *MUNROA*.
 - Inflorescence a capitate woolly panicle, not concealed; plants perennial.
 - Lemmas cleft either side of the midnerve to near the base, the lower two

- sterile, the third floret fertile, the fourth reduced to a 3-awned rudiment..... 37. BLEPHARIDACHNE.
- Lemmas 2-lobed but not deeply cleft, all fertile but the uppermost. 33. TRIDENS.
- 7b. Inflorescence an exserted open or spikelike panicle.
- 8a. Lemmas pubescent on the nerves or callus (except in *Tridens albescens*), the midnerve usually exserted as an awn or mucro.
- Nerves glabrous. Callus densely hairy; lemmas firm; panicle large, diffuse. 19. REDFIELDIA.
- Nerves hairy at least below, the lateral ones often conspicuously so.
- Palea densely long-ciliate on the upper half..... 34. TRIPLASIS.
- Palea sometimes villous but not long-ciliate on the upper half. Perennials..... 33. TRIDENS.
- 8b. Lemmas not pubescent on the nerves nor callus (the internerves sometimes pubescent), awnless.
- Glumes longer than the lemmas; lateral nerves of lemma marginal, the internerves pubescent..... 18. DISSANTHELIUM.
- Glumes shorter than the lemmas; lateral nerves of lemma not marginal, the internerves glabrous.
- Lemmas chartaceous; grain large, beaked, at maturity forcing the lemma and palea open..... 17. DIARRHENA.
- Lemmas membranaceous; if firm, the grain neither large nor beaked.
- Spikelets subterete; palea longer than the lemma, bowed out below. 16. MOLINIA.
- Spikelets compressed; palea not longer than the lemma, not bowed out below (except in *Eragrostis oxylepis* and *E. sessilis*).
- Lemmas truncate; spikelets 2-flowered..... 15. CATABROSA.
- Lemmas acute or acuminate; spikelets 3- to many-flowered.
- Rachilla continuous, the paleas persistent after the fall of the lemmas (rachilla disarticulating in Sect. Cataclastos). 14. ERAGROSTIS.
- 6b. Lemmas 5- to many-nerved, the nerves sometimes obscure.
- Spikelets with 1 to 4 empty lemmas below the fertile florets; nerves obscure; lemmas firm..... 22. UNIOLA.
- Spikelets with no empty lemmas below the fertile florets; nerves usually prominent; lemmas membranaceous (firm in a few species of *Bromus* and *Festuca*).
- Lemmas flabellate; glumes wanting; inflorescence dense, cylindric. Low annual..... 35. NEOSTAPFIA.
- Lemmas not flabellate; glumes present; inflorescence not cylindric.
- Lemmas as broad as long, the margins outspread; florets closely imbricate, horizontally spreading..... 13. BRIZA.
- Lemmas longer than broad, the margins clasping the palea; florets not horizontally spreading.
- Callus of florets bearded.
- Lemmas erose at summit, awnless..... 9. SCOLOCHLOA.
- Lemmas bifid at summit, awned..... 31. SCHIZACHNE.
- Callus not bearded (lemmas cobwebby at base in *Poa*). Lemmas not erose (slightly in *Puccinellia*).
- 9a. Lemmas keeled on the back (somewhat rounded in *Poa scabrella* and its allies).
- Spikelets strongly compressed, crowded in 1-sided clusters at the ends of the stiff, naked panicle branches..... 23. DACTYLIS.
- Spikelets not strongly compressed, not crowded in 1-sided clusters.
- Lemmas awned from a minutely bifid apex (awnless or nearly so in *Bromus catharticus* and *B. brizaeformis*); spikelets large..... 2. BROMUS.
- Lemmas awnless; spikelets small..... 12. POA.
- 9b. Lemmas rounded on the back (slightly keeled toward the summit in *Festuca* and *Bromus*).
- Glumes papery; lemmas firm, strongly nerved, scarious-margined; upper florets sterile, often reduced to a club-shaped rudiment infolded by the broad upper lemmas. Spikelets tawny or purplish, usually not green..... 30. MELICA.
- Glumes not papery; upper florets not unlike the others.
- Nerves of lemma parallel, not converging at summit or but slightly so.

- Spikelets in racemes.
 Racemes short, dense, overtopped by the leaves; spikelets awnless..... 8. *SCLEROCHLOA*.
 Racemes elongate, loose, exserted; spikelets awned or mucronate..... 10. *PLEUROPOGON*.
 Spikelets in open or contracted panicles.
 Nerves prominent; plants usually rather tall, growing in woods or fresh-water marshes..... 7. *GLYCERIA*.
 Nerves faint; plants low, growing in saline soil.
 6. *PUCCINELLIA*.
 Nerves of lemma converging toward the summit, the lemmas narrowed at apex.
 Lemmas awned or awn-tipped from a minutely bifid apex (awnless in *Bromus brizaeformis*); palea adhering to the caryopsis.
 Spikelets in open to contracted panicles; stigmas borne at the sides of the summit of ovary..... 2. *BROMUS*.
 Spikelets nearly sessile in a strict raceme; stigmas terminal on the ovary..... 3. *BRACHYPODIUM*.
 Lemmas entire, pointed, awnless or awned from the tip (minutely toothed in *Festuca elmeri* and *F. gigantea*).
 Spikelets awned (awnless in a few perennial species); lemmas pointed..... 4. *FESTUCA*.
 Spikelets awnless.
 Second glume 5- to 11-nerved; spikelets mostly 1 cm. or more long; lemmas broad.
 Florets persistent on the continuous rachilla, the caryopsis falling free..... 32A. *ECTOSPERMA*.
 Florets falling together with the joints of the articulate rachilla..... 32. *VASEYCHLOA*.
 Second glume 1- to 3-nerved; spikelets smaller; lemmas 5-nerved, membranaceous, not pointed.
 Spikelets on slender pedicels in compound panicles; perennials..... 12. *POA*.
 Spikelets on thick short pedicels in simple panicles; annual. Rachilla disarticulating at the base, forming a stipe to the floret above.... 5. *SCLEROPOA*.

TRIBE 3. HORDEAE

Spikelets 1- to several-flowered, sessile on opposite sides of a jointed or continuous axis forming symmetrical spikes (not 1-sided, but spikelets sometimes turned to one side in some species).

This small but important tribe, found in the temperate regions of both hemispheres, includes our most important cereals, wheat, barley, and rye. The rachis is flattened or concave next to the spikelets, or in some genera is thickened and hollowed out, the spikelets being more or less enclosed in the hollows. In *Triticum* and its allies there is 1 spikelet at each node of the rachis; in *Hordeum* and its allies there are 2 or 3 at each node. In *Lolium* and its allies the spikelets are placed edgewise to the rachis, and the first or inner glume is suppressed except in the terminal spikelet. The rachis of the spikes disarticulates at maturity in several genera. In some species of *Elymus* and especially in *Sitanion* the glumes are very slender, extending into long awns, in the latter genus sometimes divided into several slender bristles. The spikes are rarely branched or compound, especially in *Elymus condensatus*. In this tribe the blades of the leaves usually bear on each side at the base a small appendage or auricle.

Key to the genera of Hordeae

- 1a. Spikelets solitary at each node of the rachis (rarely 2 in species of *Agropyron*, but never throughout).
 2a. Spikelets 1-flowered, sunken in hollows in the rachis. Spikes slender, cylindric; low annuals.

- Lemmas awned; florets lateral to the rachis..... 53. SCRIBNERIA.
 Lemmas awnless; florets dorsiventral to the rachis.
 First glume wanting..... 51. MONERMA.
 First glume present, the pair standing in front of the spikelet..... 52. PARAPHOLIS.
 2b. Spikelets 2- to several-flowered, not sunken in the rachis.
 Spikelets placed edgewise to the rachis. First glume wanting except in the terminal spikelet..... 50. LOLIUM.
 Spikelets placed flatwise to the rachis.
 Plants perennial..... 42. AGROPYRON.
 Plants annual.
 Spikelets turgid or cylindric..... 44. AEGILOPS.
 Spikelets compressed.
 Glumes ovate, 3-nerved..... 43. TRITICUM.
 Glumes subulate, 1-nerved..... 45. SECALE.
 1b. Spikelets more than 1 at each node of the rachis (solitary in part of the spike in some species of *Elymus*).
 Spikelets 3 at each node of the rachis, 1-flowered, the lateral pair pediceled, usually reduced to awns..... 49. HORDEUM.
 Spikelets 2 or more (sometimes solitary in *Elymus*) at each node of the rachis, alike, 2- to 6-flowered.
 Glumes wanting or reduced to 2 short bristles; spikelets horizontally spreading or ascending at maturity. Spikes very loose..... 48. HYSTRIX.
 Glumes usually equaling the florets (reduced in *Elymus interruptus*); spikelets appressed or ascending.
 Rachis continuous (rarely tardily disarticulating); glumes broad or narrow, entire. 46. ELYMUS.
 Rachis disarticulating at maturity; glumes subulate, extending into long awns, these and the awns of the lemmas making the spike very bristly..... 47. SITANION.

TRIBE 4. AVENEAE

Spikelets 2- to several-flowered in open or contracted panicles, or rarely in racemes (solitary in *Danthonia unispicata*), glumes usually as long as or longer than the first lemma, commonly longer than all the florets; lemmas usually awned from the back or from between the teeth of a bifid apex, the awn usually bent, often twisted, the callus and rachilla joints usually villous.

A rather small tribe widely distributed in both warm and cool regions. In our genera the rachilla is prolonged beyond the upper floret as a slender stipe (except in *Aira* and *Holcus*). The lemma is awnless or nearly so in *Schismus*, two species of *Trisetum*, one species of *Koeleria*, and in most of the species of *Sphenopholis*. *Koeleria* and *Sphenopholis* are placed in this tribe because they appear to be closely allied to *Trisetum* with which they agree in having oblan- ceolate glumes about as long as the first floret.

Key to the genera of Aveneae

- Florets 2, one perfect, the other staminate.
 Lower floret staminate, the awn twisted, geniculate, exserted.... 63. ARRHENATHERUM.
 Lower floret perfect, awnless; upper floret awned..... 64. HOLCUS.
 Florets 2 or more, all alike except the reduced upper ones.
 Articulation below the glumes, the spikelets falling entire.
 Lemmas, at least the upper, with a conspicuous bent awn; glumes nearly alike. 57. TRISETUM.
 Lemmas awnless or (in *S. pallens*) the upper with a short awn; second glume much wider than the first..... 56. SPHENOPHOLIS.
 Articulation above the glumes, the glumes similar in shape.
 Lemmas bifid at apex, awned or mucronate between the lobes. Spikelets several-flowered.
 Awns conspicuous, flat, bent. Spikelets 1 cm. or more long..... 66. DANTHONIA.
 Awns minute or nearly obsolete.
 Spikelets 8 to 12 mm. long..... 65. SIEGLINGIA.
 Spikelets not more than 5 mm. long; awns, when present, slender, rounded. 54. SCHISMUS.
 Lemmas toothed, but not bifid and awned or mucronate between the lobes.
 Glumes 2 to 3.5 cm. long, 7- to 9-nerved; spikelets 2-flowered, or with a rudimentary third floret, pendulous. Plants annual..... 61. AVENA.

- Glumes not more than 1 cm. long, 1- to 5-nerved; spikelets not pendulous.
 Spikelets 3- to several-flowered, 1 to 1.5 cm. long..... 62. *HELIOTOTRICHON*.
 Spikelets 2-flowered (or 3-flowered in *Trisetum cernuum*), mostly less than 1 cm.
 long.
 Lemmas keeled, the awn when present from above the middle.
 Rachilla joints very short, glabrous or minutely pubescent; lemmas awnless
 or with a straight awn from a toothed apex..... 55. *KOELERIA*.
 Rachilla joints slender, villous; lemmas with a dorsal bent awn (awnless or
 nearly so in 2 species)..... 57. *TRisetum*.
 Lemmas convex, awned from below the middle.
 Rachilla prolonged behind the upper floret; lemmas truncate and erose-dentate
 at summit.
 Awn slender, not jointed..... 58. *DESCHAMPSIA*.
 Awn clavate, jointed near the middle..... 60. *CORYNEPHORUS*.
 Rachilla not prolonged; lemmas tapering into 2 slender teeth..... 59. *AIRA*.

TRIBE 5. AGROSTIDEAE

Spikelets 1-flowered, usually perfect, in open, contracted, or spikelike panicles, but not in true spikes nor in 1-sided racemes.

A large and important tribe, inhabiting more especially the temperate and cool regions. The articulation of the rachilla is usually above the glumes, the mature floret falling from the persistent glumes, but in a few genera the articulation is below the glumes, the mature spikelet falling entire (*Alopecurus*, *Cinna*, *Polypogon*, *Lycurus*, and *Limnodea*). The palea is small or wanting in *Alopecurus* and in some species of *Agrostis*. In a few genera the rachilla is prolonged behind the palea as a minute bristle, or sometimes as a more pronounced stipe (*Brachyelytrum*, *Limnodea*, *Cinna*, *Gastridium*, *Calamagrostis*, *Ammophila*, *Lagurus*, *Apera*, and a few species of *Agrostis*). In some genera the rachilla joint between the glumes and the lemma is slightly elongated, forming a hard stipe which remains attached to the mature fruit as a pointed callus. The callus is well marked in *Stipa* (especially in *S. spartea* and its allies) and in *Aristida*, the mature lemma being terete, indurate, and convolute, the palea wholly enclosed. In many genera the lemma is awned either from the tip or from the back, the awn being trifid in *Aristida*.

Key to the genera of Agrostideae

- Glumes wanting. Low annual..... 73. *COLEANTHUS*.
 Glumes present (the first obsolete in *Muhlenbergia schreberi* and sometimes in *Brachyelytrum*
 and *Phippsia*).
 1a. Articulation below the glumes, the spikelets falling entire.
 Spikelets in pairs in a spikelike panicle, one perfect, the other staminate or neuter, the
 pair falling together..... 78. *LYCURUS*.
 Spikelets all alike.
 Glumes long-awned..... 77. *POLYPOGON*.
 Glumes awnless.
 Rachilla not prolonged behind the palea; panicle dense.
 Glumes united toward the base, ciliate on the keel; inflorescence not capitate
 and bracteate..... 76. *ALOPECURUS*.
 Glumes not united, glabrous; inflorescence capitate in the axils of broad bracts.
 85. *CRYPsis*.
 Rachilla prolonged behind the palea; panicle narrow or open, not dense; glumes
 not united, not ciliate on the keel.
 Panicle narrow; lemma with a slender bent twisted awn from the bifid apex.
 75. *LIMNODEA*.
 Panicle open, drooping; lemma with a minute straight awn just below the entire
 apex (rarely awnless)..... 74. *CINNA*.
 1b. Articulation above the glumes.
 Fruit dorsally compressed, indurate, smooth, and shining, awnless..... 88. *MILIUM*.
 Fruit laterally compressed or terete, awned or awnless.
 2a. Fruit indurate, terete, awned, the nerves obscure; callus well developed, oblique,
 bearded.
 Awn trifid, the lateral divisions sometimes short, rarely obsolete (when obsolete no

- line of demarcation between awn and lemma as in the next).... 92. ARISTIDA.
 Awn simple, a line of demarcation between the awn and the lemma.
 Awn persistent, twisted, and bent, several to many times longer than the fruit.
 Edges of lemma overlapping (rarely only meeting), enclosing the palea; callus sharp-pointed, usually narrow and acuminate..... 91. STIPA.
 Edges of lemma not meeting, exposing the indurate sulcus of the palea, this projecting from the summit as a minute point; callus short, acutish.
 90. PIPTOCHAETIUM.
 Awn deciduous, not twisted, sometimes bent, rarely more than 3 or 4 times as long as the plump fruit; callus short, usually obtuse 89. ORYZOPSIS.
 2b. Fruit thin or firm, but not indurate; callus not well developed.
 Lemma firm, subindurate at maturity, bearing a long delicate straight awn just below the tip; palea about as long as the lemma, the naked rachilla produced back of the palea..... 70. APERA.
 Lemma thin or membranaceous.
 3a. Glumes longer than the lemma (nearly equal in *Agrostis thurberiana* and *A. aequalis*).
 Panicle feathery, capitate, nearly as broad as long; spikelets woolly.
 81. LAGURUS.
 Panicle not feathery; spikelets not woolly.
 Glumes compressed-carinate, stiff-ciliate on the keel; panicle dense, cylindric or ellipsoid..... 79. PHEUM.
 Glumes not compressed-carinate, not ciliate.
 Glumes saccate at base; lemma long-awned; panicle contracted, shining.
 80. GASTRIDIMUM.
 Glumes not saccate at base; lemma awned or awnless; panicle open or contracted.
 Floret bearing a tuft of hairs at the base from the short callus; palea well developed, the rachilla prolonged behind the palea (except in *Calamagrostis epigeios*) as a hairy bristle.... 67. CALAMAGROSTIS.
 Floret without hairs at the base or with short hairs (nearly half as long as the lemma in *A. hallii*); palea usually small or obsolete (developed and with a minute rachilla back of it in Nos. 1 to 3).
 71. AGROSTIS.
 3b. Glumes not longer than the lemma, usually shorter (the awn tips longer in *Muhlenbergia racemosa* and *M. glomerata*).
 Lemma awned from the tip or mucronate, 3- to 5-nerved (lateral nerves obscure in a few species of *Muhlenbergia*).
 Rachilla prolonged behind the palea; floret stipitate; glumes minute or obsolete..... 87. BRACHYELYTRUM.
 Rachilla not prolonged; floret not stipitate..... 82. MUHLENBERGIA.
 Lemma awnless or awned from the back.
 Floret bearing a tuft of hairs at the base from the short callus; lemma and palea chartaceous, awnless.
 Panicle spikelike; rachilla prolonged..... 68. AMMOPHILA.
 Panicle open; rachilla not prolonged..... 69. CALAMOVILFA.
 Floret without hairs at base.
 Nerves of lemma silky..... 84. BLEPHARONEURON.
 Nerves of lemma not silky.
 Caryopsis at maturity falling from the lemma and palea; seed loose in the pericarp, this usually opening when ripe; lemma 1-nerved.
 83. SPOROBOLUS.
 Caryopsis not falling from the lemma and palea, remaining permanently enclosed in them; seed adnate to the pericarp.
 Panicle few-flowered, slender, rather loose; glumes minute, unequal, the first often wanting. Low arctic-alpine perennial.
 72. PHIPPSIA.
 Panicle many-flowered, spikelike; glumes well developed, about equal.
 Panicle short, partly enclosed in the sheath; low annual.
 86. HELEOCHLOA.
 Panicle elongate; perennial..... 82. MUHLENBERGIA.

TRIBE 6. ZOYSIEAE

Spikelets subsessile in short spikes of 2 to 5 (single in *Zoysia*), each spike falling entire from the continuous axis, usually 1-flowered, all perfect, or perfect

and staminate together in the same spike; glumes usually firmer than the lemma and palea, sometimes awned, the lemma awnless.

This small and unimportant tribe is known also as Nazieae. In *Zoysia* the spikelets are single and have only 1 glume, this coriaceous, much firmer than the lemma and palea, the palea sometimes obsolete.

Key to the genera of Zoysieae

- Spikelets single; first glume wanting..... 94. ZOYSIA.
 Spikelets in clusters of 2 to 5; first glume present.
 Spikelets bearing hooked spines on the second glume, the group forming a little bur. 93. TRAGUS.
 Spikelets not bearing hooked spines, the second glume mostly cleft and awned.
 Groups of spikelets erect, the inflorescence not 1-sided..... 95. HILARIA.
 Groups of spikelets nodding along one side of the delicate axis..... 96. AEGOPOGON.

TRIBE 7. CHLORIDEAE

Spikelets 1- to several-flowered, in 2 rows on one side of a continuous rachis, forming 1-sided spikes or spikelike racemes, these solitary, digitate, or racemose along the main axis.

A large and rather important tribe, confined mostly to warm regions. The group is heterogeneous, the only common character of the genera (aside from the characters that place them in Festucoideae) being the arrangement of the spikelets in 1-sided spikes. *Chloris* and the allied genera form a coherent group, in which the spikelet consists of 1 perfect floret and, above this, 1 or more modified or rudimentary florets. *Leptochloa*, *Eleusine*, and their allies, with several-flowered spikelets, are more nearly related to certain genera of Festuceae. The spike is reduced to 2 or 3 spikelets or even to 1 spikelet and is sometimes deciduous from the main axis (*Cathestecum* and Sect. *Atheropogon* of *Bouteloua*). In *Ctenium* there are 2 sterile florets below the perfect one.

Key to the genera of Chlorideae

- Plants monoecious or dioecious. Low stoloniferous perennial..... 115. BUCHLOË.
 Plants with perfect flowers.
 1a. Spikelets with more than 1 perfect floret.
 Inflorescence a few-flowered head or capitate panicle hidden among the sharp-pointed leaves. Low spreading annual..... 114. MUNROA.
 Inflorescence exserted.
 Spikes solitary, the spikelets distant, appressed, several-flowered.... 99. TRIPOGON.
 Spikes more than 1 (sometimes 1 in depauperate *Eleusine*).
 Spikes numerous, slender, racemose on an elongate axis.
 Rachilla and callus of floret glabrous or nearly so; glumes acute, less than 5 mm. long..... 97. LEPTOCHLOA.
 Rachilla and callus of floret strongly pilose; glumes long-acuminate, about 1 cm. long..... 98. TRICHONEURA.
 Spikes few, digitate or nearly so.
 Rachis of spike extending beyond the spikelets..... 101. DACTYLOCTENIUM.
 Rachis not prolonged..... 100. ELEUSINE.
 1b. Spikelets with only 1 perfect floret, often with additional imperfect florets above or below.
 2a. Spikelets without additional modified florets, the rachilla sometimes prolonged.
 Rachilla articulate below the glumes, the spikelets falling entire.
 Glumes unequal, narrow..... 107. SPARTINA.
 Glumes equal, broad, boat-shaped..... 106. BECKMANNIA.
 Rachilla articulate above the glumes.
 Spike solitary, slender, arcuate..... 102. MICROCHLOA.
 Spikes 2 to many.
 Spikes digitate; rachilla prolonged..... 103. CYNODON.
 Spikes racemose along the main axis; rachilla not prolonged.
 Spikes slender, divaricate, the main axis elongating and becoming loosely spiral in fruit..... 105. SCHEDONNARDUS.
 Spikes short and rather stout, appressed, the axis unchanged in fruit. 104. WILLKOMMIA.

- 2b. Spikelets with 1 or more modified florets above the perfect one.
 Spikelets with 2 sterile florets below the perfect one; second glume bearing a squarrose spine on the back; spike single, arcuate..... 108. CTENIUM.
 Spikelets with no sterile florets below the perfect one; second glume without a squarrose spine.
 Spikes digitate or nearly so.
 Fertile lemma 1-awned or awnless..... 110. CHLORIS.
 Fertile lemma 3-awned..... 111. TRICHLORIS.
 Spikes racemose along the main axis.
 Spikelets distant, appressed; spikes slender, elongate..... 109. GYMNOPOGON.
 Spikelets approximate or crowded, not appressed; spikes usually short and rather stout.
 Spikelets 3 in each spike, the 2 lateral staminate or rudimentary; spikes falling entire..... 113. CATHESTECUM.
 Spikelets 2 to many (rarely 1) in each spike, all alike; spikes falling entire or persistent, the florets falling..... 112. BOUTELOUA.

TRIBE 8. PHALARIDEAE

Spikelets with 1 perfect terminal floret and, below this, a pair of staminate or neuter florets (1 sometimes obsolete in *Phalaris*).

A small tribe of about 6 genera, 4 of which are found in the United States. In *Phalaris* the lower florets are reduced to minute scalelike lemmas closely appressed to the edges of the fertile floret. In *Hierochloë* the lateral florets are staminate and as large as the fertile floret.

Key to the genera of Phalarideae

- Lower florets staminate; spikelets brown, shining..... 116. HIEROCHLOË.
 Lower florets neuter; spikelets green or yellowish.
 Lower florets consisting of awned hairy sterile lemmas exceeding the fertile floret. 117. ANTHOXANTHUM.
 Lower florets reduced to small awnless scalelike lemmas, much smaller than the fertile florets..... 118. PHALARIS.

TRIBE 9. ORYZEAE

Spikelets 1-flowered, perfect, strongly laterally compressed, paniculate; glumes reduced or wanting; palea apparently 1-nerved; stamens 6.

A small tribe whose affinities are not evident. It includes rice, the important food plant.

Key to the genera of Oryzeae

- Glumes minute; lemma often awned..... 119. ORYZA.
 Glumes wanting; lemma awnless..... 120. LEERSIA.

TRIBE 10. ZIZANIEAE

Spikelets unisexual, the pistillate terete or nearly so; glumes shorter than the lemma, usually 1 or both obsolete, the pedicel disarticulating below the spikelet. Glumes well developed in *Pharus*, a tropical genus placed in this tribe provisionally.

A small tribe of uncertain affinities, aquatic or subaquatic grasses (except *Pharus*) of no economic importance except the Indian rice (*Zizania*).

Key to the genera of Zizanieae

- Blades elliptic, 2 to 4 cm. wide..... 125. PHARUS.
 Blades much longer than wide.
 Culms slender; plants low; staminate and pistillate spikelets borne in separate inflorescences.
 Inflorescence a few-flowered raceme; floating aquatic..... 124. HYDROCHLOA.
 Inflorescence a panicle; plants stoloniferous..... 123. LUZIOLA.
 Culms robust; plants tall; staminate and pistillate spikelets borne in the same panicle.
 Pistillate spikelets on the ascending upper branches, the staminate on the spreading

- lower branches of the panicle; plants annual or perennial..... 121. *ZIZANIA*.
 Pistillate spikelets at the ends, the staminate below on the same branches of the panicle;
 plants perennial..... 122. *ZIZANIOPSIS*.

TRIBE 11. MELINIDEAE

Spikelets disarticulating below the glumes, these very unequal, the first minute, the second and the sterile lemma equal, membranaceous, strongly nerved, the latter bearing a slender awn from the notched summit; fertile lemma and palea thinner in texture, awnless.

A tribe of about a dozen genera represented in the United States by an introduced species, *Melinis minutiflora*.

TRIBE 12. PANICEAE

Spikelets with 1 perfect terminal floret and below this a sterile floret and 2 glumes; fertile lemma and palea indurate or at least firmer than the glumes and sterile lemma, a lunate line of thinner texture at the back just above the base, the rootlet protruding through this at germination; articulation below the spikelet.

A large tribe, confined mostly to warm regions, and containing relatively few economic species. The first glume is wanting in some genera, such as *Paspalum*, and rarely the second glume also (*Reimarochloa*). The spikelets are usually awnless, but the glumes and sterile lemma are awned in *Echinochloa* and *Oplismenus*, and the second glume and sterile lemma in *Rhynchelytrum*. In *Eriochloa* and in some species of *Brachiaria* the fertile lemma is awn-tipped. In *Setaria* there are, beneath the spikelet, 1 or more bristles, these representing sterile branchlets. In *Pennisetum* similar bristles form an involucre, falling with the spikelet. In *Cenchrus* the bristles are united, forming a bur. The spikelets are of 2 kinds in *Amphicarpum*, aerial and subterranean. The culms are woody and perennial in *Lasiacis* and *Olyra*.

Key to the genera of Paniceae

Spikelets of two kinds.

Spikelets all perfect, but those of the aerial panicle rarely perfecting grains, the fruitful spikelets borne on subterranean branches..... 146. *AMPHICARPUM*.

Spikelets unisexual, the pistillate above, the staminate below on the branches of the same panicle. Blades broad, elliptic..... 147. *OLYRA*.

Spikelets all of one kind.

Spikelets sunken in the cavities of the flattened corky rachis..... 131. *STENOTAPHRUM*.

Spikelets not sunken in the rachis.

1a. Spikelets subtended or surrounded by 1 to many distinct or more or less connate bristles, forming an involucre.

Bristles persistent, the spikelets deciduous..... 143. *SETARIA*.

Bristles falling with the spikelets at maturity.

Bristles not united at base, slender, often plumose..... 144. *PENNISSETUM*.

Bristles united into a burlike involucre, the bristles retrorsely barbed.

145. *CENCHRUS*.

1b. Spikelets not subtended by bristles.

Glumes or sterile lemma awned (awn short and concealed in the silky hairs of the spikelet in *Rhynchelytrum*; awn reduced to a point in *Echinochloa colonum*).

Inflorescence paniculate; spikelets silky..... 142. *RHYNCHELYTRUM*.

Inflorescence of unilateral simple or somewhat compound racemes along a common axis; spikelets smooth or hispid, not silky.

Blades lanceolate, broad, thin; culms creeping..... 140. *OPLISMENUS*.

Blades long, narrow; culms not creeping..... 141. *ECHINOCHLOA*.

Glumes and sterile lemma awnless.

2a. Fruit cartilaginous-indurate, flexible, usually dark-colored, the lemma with more or less prominent white hyaline margins, these not inrolled.

Spikelets covered with long silky hairs, arranged in racemes, these panicked.

128. *TRICHACHNE*.

Spikelets glabrous or variously pubescent but not long-silky (somewhat silky in *Digitaria villosa*).

Spikelets in slender racemes more or less digitate at the summit of the culms.

129. DIGITARIA.

Spikelets in panicles.

Fruiting lemma boat-shaped; panicles narrow..... 127. ANTHAENANTIA.

Fruiting lemma convex; panicles diffuse..... 130. LEPTOLOMA.

2b. Fruit chartaceous-indurate, rigid.

Spikelets placed with the back of the fruit turned away from the rachis of the racemes, usually solitary (not in pairs).

First glume and the rachilla joint forming a swollen ringlike callus below the spikelet..... 132. ERIOCHLOA.

First glume present or wanting, not forming a ringlike callus below the spikelet.

First glume present (next to the axis); racemes racemose along the main axis..... 133. BRACHIARIA.

First glume wanting; racemes digitate or subdigitate..... 134. AXONOPUS.

Spikelets placed with the back of the fruit turned toward the rachis (first glume, when present, away from the rachis) of the spikelike racemes or pedicellate in panicles.

Fruit long-acuminate; both glumes wanting..... 135. REIMAROCHLOA.

Fruit not long-acuminate; at least one glume present.

First glume typically wanting; spikelets plano-convex, subsessile in spikelike racemes..... 136. PASPALUM.

First glume present; spikelets usually in panicles.

Second glume inflated-saccate, this and the sterile lemma much exceeding the stipitate fruit..... 139. SACCIOLEPIS.

Second glume not inflated-saccate.

Culms woody, bamboolike; fruit with a tuft of down at the apex.

138. LASIACIS.

Culms herbaceous; no tuft of down at the apex of the fruit.

137. PANICUM.

TRIBE 13. ANDROPOGONEAE

Spikelets in pairs along a rachis, the usual arrangement being one of the pair sessile and fertile, the other pedicellate and staminate or neuter, rarely wanting, only the pedicel present; fertile spikelet consisting of 1 perfect terminal floret and, below this, a staminate or neuter floret, the lemmas thin or hyaline, and 2 awnless glumes, 1 or usually both firm or indurate.

A large tribe, confined mostly to warm regions. The rachis is usually jointed, disarticulating at maturity, with the spikelets attached to the joints. In a few genera it is thickened. Sometimes the racemes are shortened to 1 or 2 joints and borne on branches, the whole forming a panicle (as in *Sorghum* and *Sorghastrum*) instead of a series of racemes. In a few genera the spikelets of the pair are alike. In *Trachypogon* the fertile spikelet is pedicellate and the sterile one nearly sessile. The most important economic plants in this tribe are sugarcane and sorghum.

Key to the genera of Andropogoneae

1a. Spikelets alike, all perfect. (See also *Arthraxon* and *Sorghastrum* in which pedicellate spikelets are not developed.)

Spikelets surrounded by a copious tuft of soft hairs.

Rachis continuous, the spikelets falling; the spikelets of the pair unequally pedicellate.

Racemes in a narrow spikelike panicle; spikelets awnless..... 148. IMPERATA.

Racemes in a broad fan-shaped panicle; spikelets awned..... 149. MISCANTHUS.

Rachis breaking up into joints at maturity with the spikelets attached; one spikelet sessile, the other pedicellate.

Spikelets awnless..... 150. SACCHARUM.

Spikelets awned..... 151. ERIANTHUS.

Spikelets not surrounded by turfs of hairs; racemes few..... 152. MICROSTEGIUM.

1b. Spikelets unlike, the sessile perfect, the pedicellate sterile (sessile spikelet staminate, pedicellate spikelet perfect in *Trachypogon*).

2a. Pedicel thickened, appressed to the thickened rachis joint (at least parallel to it) or adnate to it; spikelets awnless, appressed to the joint.

- Rachis joint and pedicel adnate. Annuals.
 Perfect spikelet globose; sterile spikelet conspicuous..... 164. *HACKELOCHLOA*.
 Perfect spikelet oblong; sterile spikelet minute..... 162. *ROTTBOELLIA*.
 Rachis joint and pedicel distinct, the sessile spikelet appressed to them, its first glume lanceolate.
 Racemes subcylindric; rachis joints and pedicels glabrous, much thicker at the summit, the spikelets sunken in the hollow below; sterile spikelet rudimentary. 163. *MANISURIS*.
 Racemes flat; rachis joints and pedicels woolly, not much thicker at the summit; sterile spikelet staminate or neuter..... 161. *ELYONURUS*.
 2b. Pedicel not thickened (if slightly so the spikelets awned), neither appressed nor adnate to the rachis joint, this usually slender; spikelets usually awned.
 3a. Fertile spikelet with a hairy-pointed callus, formed of the attached supporting rachis joint or pedicel; awns strong.
 Racemes reduced to a single joint, long-peduncled in a simple open panicle. 158. *CHRYSOPOGON*.
 Racemes of several to many joints, single.
 Primary spikelet subsessile, sterile, persistent on the continuous axis after the fall of the fertile pedicellate spikelet..... 160. *TRACHYPOGON*.
 Primary spikelet sessile, fertile; pedicellate spikelet sterile. Lower few to several pairs of spikelets all staminate or neuter..... 159. *HETEROPOGON*.
 3b. Fertile spikelet without a callus (a short callus in *Hyparrhenia*), the rachis disarticulating immediately below the spikelet; awns slender.
 Blades ovate. Annual..... 153. *ARTHRAOXON*.
 Blades narrow, elongate.
 Racemes of several to many joints, solitary, digitate, or aggregate in panicles.
 Lower pair of spikelets like the others of the raceme..... 154. *ANDROPOGON*.
 Lower pair of spikelets sterile, awnless. Racemes in pairs on slender flexuous peduncles..... 155. *HYPARRHENIA*.
 Racemes reduced to one or few joints, these mostly peduncled in a subsimple or compound panicle.
 Pedicellate spikelets staminate..... 156. *SORGHUM*.
 Pedicellate spikelets wanting, the pedicel only present..... 157. *SORGHASTRUM*.

TRIBE 14. TRIPSACEAE

Spikelets unisexual, the staminate in pairs, or sometimes in threes, 2-flowered, the pistillate usually single, 2-flowered, the lower floret sterile, embedded in hollows of the thickened articulate rachis and falling attached to the joints, or enclosed in a thickened involucre or sheath or, in *Zea*, crowded in rows on a thickened axis (cob); glumes membranaceous or thick and rigid, awnless; lemmas and palea hyaline, awnless. Plants monoecious.

This small tribe of seven genera is scarcely more than a subtribe of *Andropogoneae*, differing chiefly in the total suppression of the sterile spikelet of a pair, the fertile spikelet being pistillate only and solitary; staminate spikelets paired. It is also known as *Maydeae*.

Key to the genera of Tripsaceae

- Staminate and pistillate spikelets in separate inflorescences, the first in a terminal tassel, the second in the axils of the leaves.
 Pistillate spikes distinct, the spikelets embedded in the hardened rachis, this disarticulating at maturity..... 167. *EUCHLAENA*.
 Pistillate spikes grown together forming an ear, the grains at maturity much exceeding the glumes..... 168. *ZEa*.
 Staminate and pistillate spikelets in separate portions of the same inflorescence, the pistillate below.
 Spikes short, the 1- or 2-flowered pistillate portion enclosed in a beadlike sheathing bract. 165. *Coix*.
 Spikes many-flowered, the pistillate portion breaking up into several 1-seeded joints; no beadlike sheathing bract..... 166. *TRIPSACUM*.

DESCRIPTIONS OF GENERA AND SPECIES

TRIBE 1. BAMBUSEAE

1. ARUNDINÁRIA Michx. CANE

Spikelets 8- to 12-flowered, large, compressed, the rachilla disarticulating above the glumes and between the florets; glumes unequal, shorter than the lemmas, the first sometimes wanting; lemmas papery, rather fragile, about 11-nerved, acute, acuminate, mucronate or awn-tipped; palea about as long as the lemma or a little shorter, prominently 2-keeled, deeply sulcate between the keels; rachilla joints rather thick, appressed-hirsute; stamens 3; caryopsis narrowly elliptic, terete, 1 to 1.2 cm. long. Shrubs or tall reeds with extensively creeping horizontal rhizomes 5 to 10 mm. thick, the woody perennial branching culms erect, 2 to 5 m., sometimes to 8 m., tall and 2 cm. thick, freely branching, the flowering branchlets borne in fascicles on the main culm or on primary branches, their sheaths bladeless or nearly so, flowering shoots also arising from the rhizomes, their sheaths bladeless; flowering at infrequent intervals, usually each species over a wide area simultaneously, the flowering period apparently continuing for about a year; the flowering culms apparently dying after setting seed; sterile branches numerous and repeatedly branching, the basal shoots and primary branches with 6 to 10 loose, papery culm-sheaths with narrow rudimentary blades 2 to 20 mm. long, not petiolate at base, and 4 to 10 large petiolate tessellate blades toward the ends, their sheaths overlapping, the upper blades crowded, the lower papery sheaths finally falling, the leaf-sheaths bearing several flat scabrous bristles at the summit, these readily falling in age. Type species, *Arundinaria macrosperma* Michx. (*A. gigantea*). Name from Latin *Arundo*, a reed.

- Primary branches erect or nearly so, the individual culm with its branches oblong-linear in outline; spikelets usually rather loose; lemmas appressed-hirsute or canescent, at least toward the base, greenish tawny to bronze-russet..... 1. *A. GIGANTEA*.
 Primary branches ascending at an angle of about 45°, the individual culm with its branches broadly lanceolate in outline; spikelets rather compact; lemmas glabrous or obscurely pubescent at base only, usually livid-purple..... 2. *A. TECTA*.

1. *Arundinaria gigantea* (Walt.)

Muhl. GIANT CANE. (Fig. 1.) Culms as much as 2 cm. thick and 2 to 8 m. tall, smooth; lower sheaths about half as long as the internodes, finally falling, the upper 6 to 10 sheaths striate, tessellate, usually hirsute, becoming glabrous or nearly so, densely ciliate, canescent at base, the 10 to 12 bristles at the summit 5 to 9 mm. long, these often borne from the margin of a rather firm auricle, this sometimes prominent but often obscure or wanting, a dense band of stiff hairs across the collar; ligule firm, scarcely 1 mm. long; blades of main culm and primary branches 15 to 27 cm. long, 2.5 to 4 cm. wide, rounded at base (petiole 1 to 2 mm. long), strongly finely

tessellate, acuminate, pubescent to glabrous on the lower surface, puberulent to glabrous on the upper, the margin finely serrulate; blades of ultimate branchlets much smaller, often crowded in flabellate clusters, commonly glabrous or nearly so; flowering branchlets finally crowded toward the ends of the branches, the racemes or simple panicles with few to several spikelets on slender angled pedicels 2 to 30 mm. long, hirsute to nearly glabrous; spikelets 4 to 7 cm. long, about 8 mm. wide, mostly 8- to 12-flowered, rather loose; glumes distant, acuminate, pubescent, the lower minute, sometimes wanting; lemmas broadly lanceolate, keeled, mostly 1.5



FIGURE 1.—*Arundinaria gigantea*. Flowering shoot, $\times \frac{1}{2}$; summit of culm sheath, outer and inner face, showing auricles and ligule, and two views of floret, $\times 2$. (Swallen 6717, Miss.)

to 2 cm. long, sometimes tapering into an awn 4 mm. long, ciliate, appressed-hirsute to canescent, rarely glabrous except toward the base and margins, faintly to clearly tessellate; rachilla segments densely hirsute; palea scabrous on the keels. 21 —Forming extensive colonies in low woods, river banks, moist ground, southern Ohio, Indiana, Illinois, Missouri, and Oklahoma to North Carolina, Florida, and Texas, mostly above the Coastal Plain. Livestock eagerly eat the young plants, leaves, and seeds, and canebrakes furnish much forage. The young shoots are sometimes used as a pot-herb. The culms are used for fishing rods, pipestems, baskets, mats, and a variety of other purposes. Early travelers speak of the abundance of this species and state that the culms may be as much as 2 or even 3 inches in diameter. It is said that the plants are easily destroyed by the continuous grazing of cattle and by the rooting of swine.

2. *Arundinaria técta* (Walt.) Muhl.
SWITCH CANE. (Fig. 2.) Similar to *A. gigantea*, the culms usually not more than 2 m. tall, the sheaths more commonly as long as the internodes; auricle at summit of sheaths only rarely developed, the bristles 2 to 6 mm. long, a very short firm erose to ciliate membrane across the collar; blades on the average a little longer and narrower; inflorescence similar, the spikelets 3 to 5 cm. long, 6- to 12-flowered, relatively compact and less compressed than in the preceding; glumes obtuse to acuminate, often glabrous or nearly so; lemmas scarcely keeled, 12 to 15 mm. long, glabrous or minutely canescent at the base, rarely very faintly tessellate toward the summit; the rachilla strigose. 21 —Forming colonies in swampy woods, moist pine barrens and live oak woods, and sandy margins of streams,

Coastal Plain, southern Maryland to Alabama and Mississippi. Two collections from northwest Florida appear to be intermediate between the two species.

A great many exotic species of bamboo have been introduced into cultivation in the United States, particularly from China, Japan, India, and Java. *Arundinaria*, *Bambusa*, *Cephalostachyum*, *Chimonobambusa*, *Dendrocalamus*, *Gigantochloa*, *Guadua*, *Indocalamus*, *Lingnania*, *Oxytenanthera*, *Phyllostachys*, *Pleiblastus*, *Pseudosasa*, *Sasa*, *Schizostachyum*, *Semiarundinaria*, *Shibataea*, *Sinarundinaria*, *Sinobambusa*, *Sinocalamus*, and *Thamnocalamus* are the principal genera represented. In southern Florida the commonest introduced species are *Bambusa multiplex* (Lour.) Raeusch., *B. bambos* (L.) Voss,⁶ *B. vulgaris* Schrad. ex Wendl., and *Sinocalamus oldhami* (Munro) McClure ("*Dendrocalamus latiflorus*" of California and Florida gardens). Farther north, where the minimum winter temperatures are lower, *Arundinaria simoni* (Carr.) A. and C. Riv., *Phyllostachys aurea* A. and C. Riv., and *P. bambusoides* Sieb. and Zucc. are the commonest, and in regions where the winters are still more severe *Pseudosasa japonica* (Sieb. and Zucc.) Makino is the species most commonly found in cultivation in the open air; escaped in Philadelphia. In California, *Sinocalamus oldhami*, *Bambusa multiplex*, and several species of *Phyllostachys* are about equally popular. The most recent systematic treatment of the species of bamboo cultivated in the United States is that of Rehder.⁷

⁶ Contributed by F. A. McCLURE; see also McCLURE, F. A. THE GENUS BAMBUSA AND SOME OF ITS FIRST-KNOWN SPECIES. *Blumea* Sup. 3. (Hennard Jubilee vol.): 90-112, pl. 1-7, 1946; and YOUNG, R. A. BAMBOOS IN AMERICAN HORTICULTURE. *Nat. Hort. Mag.* 1945: 171-196; 274-291; 1946: 40-64; 257-283; 352-365, illus.

⁷ REHDER, ALFRED. *MANUAL OF CULTIVATED TREES AND SHRUBS*. Ed. 2, 996 pp. New York. 1940.



FIGURE 2.—*Arundinaria tecta*. Flowering and leafy shoot, $\times \frac{1}{2}$; spikelet and floret, $\times 2$. (Chase 5881, Va.); summit of culm sheath, outer and inner face, $\times 2$. (Amer. Gr. Natl. Herb. 498, Va.)

TRIBE 2. FESTUCEAE

2. BRÓMUS L. BROMEGRASS

Spikelets several- to many-flowered, the rachilla disarticulating above the glumes and between the florets; glumes unequal, acute, the first 1- to 3-nerved, the second usually 3- to 5-nerved; lemmas convex on the back or keeled, 5- to 9-nerved, 2-toothed, awned from between the teeth or awnless; palea usually shorter than the lemma, ciliate on the keels. Low or rather tall annuals or perennials with closed sheaths, usually flat blades, and open or contracted panicles of large spikelets. Standard species, *Bromus sterilis* (type species, *B. secalinus*). Name from *bromos*, an ancient Greek name for the oat, from *broma*, food.

The native perennial species of brome grass form a considerable portion of the forage in open woods of the mountain regions of the western United States. *Bromus carinatus*, California brome, and its more eastern ally, *B. marginatus*, are abundant from the Rocky Mountains to the Pacific coast. Before maturity, they are relished by all classes of stock. Horses and sheep are particularly fond of the seed heads. *Bromus anomalus*, *B. pumpellianus*, and *B. ciliatus*, of the Rocky Mountain region, are abundant up to 10,000-11,000 feet altitude, and are of first rank for all classes of stock. Several other species are nutritious but are usually not abundant enough to be of importance in the grazing regions. The most important species agronomically is smooth brome, *B. inermis*, a native of Eurasia, which is cultivated for hay and pasture in the northern part of the Great Plains. It is more drought-resistant than timothy and can be grown farther west on the Plains, but does not thrive south of central Kansas. It is recommended for holding canal banks. Also called smooth, awnless, and Hungarian brome. Rescue grass, *B. catharticus*, is cultivated for winter forage in the Southern States from North Carolina to Texas and in the coast district of southern California.

The annuals are weedy species introduced mostly from Europe. The best known of these is chess, *Bromus secalinus*, a weed of waste places sometimes infesting grainfields. Formerly it was believed by the credulous that under certain conditions wheat changed into chess or "cheat." Chess in a wheatfield is due to chess seed in the soil or in the wheat sown. This species is utilized for hay in places in Washington, Oregon, and Georgia. On the Pacific coast the annual brome grasses cover vast areas of open ground at lower altitudes where they form a large part of the forage on the winter range. They mature in spring or early summer and become unpalatable. Those of the section *Eubromus* are, at maturity, a serious pest. The narrow, sharp-pointed minutely barbed florets (or fruits) with their long rough awns work into the eyes, nostrils, and mouths of stock, causing inflammation and often serious injury. Sometimes the intestines are pierced, and death results. On the Pacific coast, *B. rigidus*, the chief offender, is called ripgut grass by stockmen, and the name is sometimes applied to other species of the section.

Spikelets strongly flattened, the lemmas compressed-keeled..... Section 1. CERATOCHLOA.
Spikelets terete before anthesis or somewhat flattened, but the lemmas not compressed-keeled.

Plants perennial..... Section 2. BROMOPSIS.

Plants annual. Introduced, mostly from Europe.

Awn straight or divaricate, sometimes minute or obsolete, not twisted and geniculate; teeth of the lemma sometimes slender but not aristate.

Lemmas broad, rounded above, not acuminate, the teeth mostly less than 1 mm. long..... Section 3. BROMIUM.

Lemmas narrow, with a sharp callus, gradually acuminate, bifid, the teeth 2 to 5 mm. long. Awns usually more than 1.5 cm. long.... Section 4. EUBROMUS.

Awn geniculate, twisted below; teeth of the lemma aristate.

Section 5. NEOBROMUS.

Section 1. *Ceratochloa*

- Lemmas awnless or nearly so..... 1. *B. CATHARTICUS*.
 Lemmas awned, the awn more than 3 mm. long.
 Panicle branches elongate, slender, drooping, bearing 1 or 2 large spikelets at the end, the lowermost naked for as much as 10 to 15 cm. Sheaths smooth; Washington and Oregon..... 2. *B. SITCHENSIS*.
 Panicle branches not greatly elongate.
 Panicle branches ascending, rather stiff, naked below, bearing 1 or 2 large spikelets. Washington..... 3. *B. ALEUTENSIS*.
 Panicle branches short and ascending or longer and drooping, with some short branches at the base.
 Blades canescent, densely short-pilose, 2 to 5 mm. wide, often involute; panicle narrow..... 4. *B. BREVIARISTATUS*.
 Blades not canescent, glabrous to puberulent or sparsely pilose, mostly 5 to 12 mm. wide.
 Sheaths strongly to sparsely retrorsely pilose; blades 4 to 12 mm. wide; lemmas usually pubescent, the awns mostly less than 7 mm. long; plants perennial. 7. *B. MARGINATUS*.
 Sheaths scaberulous to pilose.
 Plants annual or biennial; culms mostly 30 to 100 cm. tall; spikelets rather open at anthesis, the rachilla joints relatively long; awns 7 to 15 mm. long.
 Spikelets 6- to 10-flowered; second glume shorter than the lowest lemma. 5. *B. CARINATUS*.
 Spikelets mostly 5- to 7-flowered; second glume nearly or quite equaling the length of the lowest floret..... 6. *B. ARIZONICUS*.
 Plants perennial; awns mostly less than 15 mm. long.
 Culms erect, mostly 80 to 120 cm. tall; panicle mostly open; spikelets rather glossy, loose, the rachilla joints relatively long..... 9. *B. POLYANTHUS*.
 Culms subgeniculate and leafy at base, mostly 25 to 70 cm. tall; panicle rather dense; spikelets closely flowered..... 8. *B. MARITIMUS*.

Section 2. *Bromopsis*

- 1a. Creeping rhizomes present; lemmas awnless or short-awned; panicle erect, somewhat open, the branches ascending.
 Lemmas glabrous..... 10. *B. INERMIS*.
 Lemmas pubescent near the margins..... 11. *B. PUMPELLIANUS*.
 1b. Creeping rhizomes wanting (base of culm decumbent in *B. laevipes*).
 2a. Panicle narrow, the branches erect.
 Lemmas glabrous or evenly scabrous..... 12. *B. ERECTUS*.
 Lemmas appressed-pubescent on the margins and lower part..... 13. *B. SUKSDORFII*.
 2b. Panicle open, the branches spreading or drooping.
 3a. Lemmas glabrous.
 Blades broad and lax, more than 5 mm., at least some of them 10 mm., wide (var. *laeviglumis*)..... 20. *B. PURGANS*.
 Blades narrow, not more than 6 mm. wide..... 23. *B. TEXENSIS*.
 3b. Lemmas pubescent.
 4a. Lemmas pubescent along the margin and on lower part of the back, the upper part glabrous.
 First glume 3-nerved; plant mostly pale or glaucous. Culms decumbent at base. 17. *B. LAEVIPIES*.
 First glume 1-nerved, or only faintly 3-nerved near the base; plants dark green.
 Ligule prominent, 3 to 5 mm. long; lemmas narrow; awn usually more than 5 mm. long..... 18. *B. VULGARIS*.
 Ligule inconspicuous, about 1 mm. long; lemmas broad; awn 3 to 5 mm. long. 19. *B. CILIATUS*.
 4b. Lemmas pubescent rather evenly over the back, usually more densely so along the lower part of the margin (glabrous in *B. purgans* var. *laeviglumis*).
 Panicle branches short, stiffly spreading; blades short, mostly on lower part of culm..... 14. *B. ORCUTTIANUS*.
 Panicle branches lax or drooping; blades along the culm, mostly elongate.
 Panicle small, drooping, usually not more than 10 cm. long. Spikelets densely and conspicuously pubescent.
 Sheaths and blades sparsely pilose to subglabrous; blades mostly 2 to 4 mm. wide (rarely 5 to 6 mm.)..... 24. *B. ANOMALUS*.
 Sheaths and blades (except uppermost in some) conspicuously pubescent; blades 5 to 10 mm. wide..... 25. *B. KALMII*.

Panicle larger, usually erect, the branches more or less drooping. Blades mostly wide and lax.

Ligule 3 to 4 mm. long; blades pilose above, scabrous or smooth beneath; panicle large, open, the slender branches long, drooping.

16. *B. PACIFICUS*.

Ligule short; blades pubescent or pilose on both surfaces, or glabrous or scabrous.

Blades densely short-pubescent on both surfaces..... 15. *B. GRANDIS*.

Blades more or less pilose or glabrous.

Sheaths, at least the lower, retorsely pilose (rarely glabrous in *B. purgans*) blades mostly more than 5 mm. wide.

Sheaths shorter than the internodes. Nodes 4 to 6.... 20. *B. PURGANS*.

Sheaths as long as or longer than the internodes.

Second glume 5-nerved; nodes 6 to 8; sheaths without flanges at the mouth..... 22. *B. NOTTOWAYANUS*.

Second glume 3-nerved; nodes 10 to 20; sheaths with prominent flanges at the mouth..... 21. *B. LATIGLUMIS*.

Sheaths glabrous; blades mostly less than 5 mm. wide.... 26. *B. FRONDOSUS*.

Section 3. *Bromium*

Panicle contracted, rather dense, the branches erect or ascending.

Lemmas glabrous..... 37. *B. RACEMOSUS*.

Lemmas pubescent.

Spikelets compressed; lemmas rather thin and narrow..... 31. *B. MOLLIFORMIS*.

Spikelets turgid; lemmas rather thick, broader..... 30. *B. MOLLIS*.

Panicle open, the branches spreading.

Awn short or wanting; lemmas obtuse, inflated (see also short-awned forms of *B. secalinus*).

27. *B. BRIZAEFORMIS*.

Awn well developed.

Foliage glabrous..... 28. *B. SECALINUS*.

Foliage pubescent.

Branches of the panicle rather stiffly spreading or drooping, not flexuous; awn straight.

29. *B. COMMUTATUS*.

Branches lax or flexuous, usually slender, but rather stout in *B. squarrosus*.

Spikelets inflated, 5 to 8 mm. or even 10 mm. wide; awns flattened, strongly divergent, about 1 cm. long; panicle branches stout but flexuous, bearing 1 or 2 spikelets..... 33. *B. SQUARROSUS*.

Spikelets not inflated, usually less than 5 mm. wide, if more the spikelets pubescent; awn not strongly flattened, straight or somewhat spreading.

Panicle 8 to 11 cm. (rarely to 15 cm.) long; branches and pedicels conspicuously flexuous or curled; lemmas pubescent..... 36. *B. ARENARIUS*.

Panicle 15 to 25 cm. long (smaller in depauperate specimens), the long branches spreading or drooping, somewhat flexuous but usually not curled; lemmas glabrous or scaberulous.

Palea distinctly shorter than its lemma; awn flexuous, usually somewhat divergent in drying; spikelets rather turgid..... 34. *B. JAPONICUS*.

Palea about as long as its lemma; awn straight or nearly so in drying; spikelets thinner and flatter, scarcely turgid..... 35. *B. ARVENSIS*.

Section 4. *Eubromus*

Panicle contracted, erect; awn 12 to 20 mm. long.

Culms pubescent below the dense panicle..... 39. *B. RUBENS*.

Culms glabrous below the scarcely dense panicle..... 40. *B. MADRITENSIS*.

Panicle open, the branches spreading.

Second glume usually less than 1 cm. long; pedicels capillary, flexuous.

41. *B. TECTORUM*.

Second glume more than 1 cm. long; pedicels sometimes flexuous but not capillary.

Awn about 2 cm. long; first glume 8 mm. long..... 38. *B. STERILIS*.

Awn 3 to 5 cm. long; first glume about 15 mm. long..... 37. *B. RIGIDUS*.

Section 5. *Neobromus*

A single species..... 42. *B. TRINII*.

SECTION 1. *CERATÓCHLOA* (Beauv.) Griseb.

Annuals, biennials, or perennials; spikelets large, distinctly compressed; glumes and lemmas keeled, rather firm.

1. **Bromus catharticus** Vahl. RESCUE GRASS. (Fig. 3.) Annual or biennial; culms erect to spreading, as

much as 100 cm. tall; sheaths glabrous or pubescent; blades narrow, glabrous or sparsely pilose; panicle

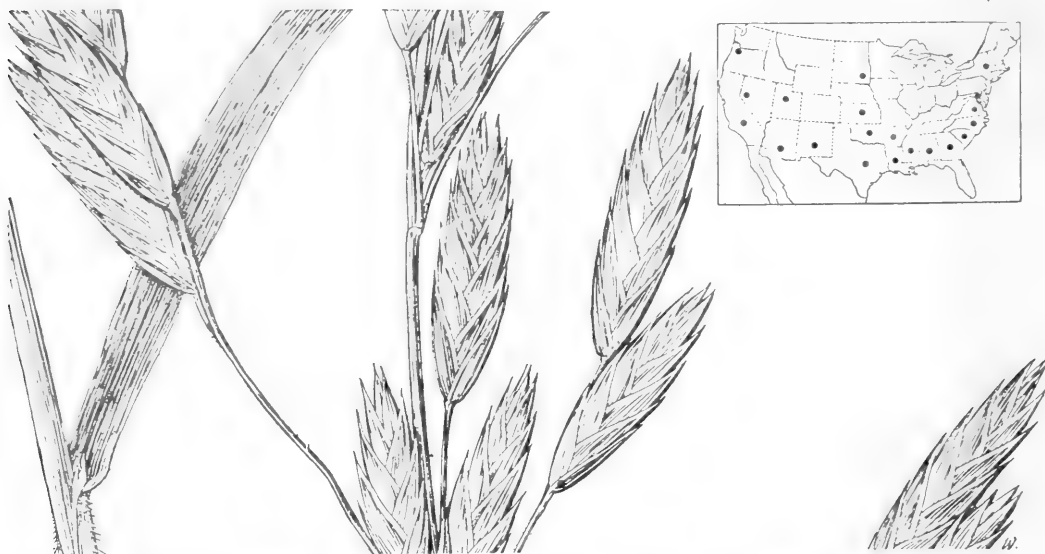


FIGURE 3.—*Bromus catharticus*, $\times 1$. (Peebles, Harrison, and Kearney 1271, Ariz.)



FIGURE 4.—*Bromus sitchensis*, $\times 1$. (Piper 3013, Alaska.)

open, as much as 20 cm. long, the branches as much as 15 cm. long, naked at base, in small plants the panicles reduced to a raceme of a few appressed short-pediceled spikelets; spikelets 2 to 3 cm. long, 6- to 12-flowered; glumes acuminate, about 1 cm. long; lemmas glabrous, scabrous, or sometimes pubescent, acuminate, 1.5 cm. long, closely overlapping, concealing the short rachilla joints, awnless or with an awn 1 to 3 mm. long; palea two-thirds as long as the lemma. ☉ (*B. unioides* H. B. K.)—Cultivated in the Southern States as a winter forage grass. Escaped from cultivation or sparingly introduced in waste places throughout Southern States and rarely northward. Known also as Schrader's brome grass. Introduced from South America.

2. *Bromus sitchénsis* Trin. (Fig. 4.) Stout smooth perennial; culms 120 to 180 cm. tall; sheaths glabrous; blades elongate, 7 to 12 mm. wide, sparsely pilose on the upper surface; panicles large, lax, drooping, 25 to 35 cm. long, the lower branches (2 to 4) as much as 20 cm. long, naked below for as much as 10 or 15 cm., few-flowered; spikelets 2.5 to 3.5 cm. long, 6- to 12-flowered, the rachilla joints longer than in *B. catharticus*, exposed at anthesis; lemmas scabrous, sometimes hirtellous toward base; awn 5 to 10 mm. long. ☉ —Woods and banks near the coast, Alaska to Oregon.

3. *Bromus aleuténsis* Trin. ex Griseb. (Fig. 5.) Culms rather stout, erect from a usually decumbent base, 50 to 100 cm. tall; sheaths sparsely retrorse-pilose or glabrous; blades sparsely pilose, 5 to 10 mm. wide; panicle erect, loose, 10 to 20 cm. long, the branches rather stiffly ascending, bearing 1 or 2 (rarely 3) spikelets, the lower as much as 10 cm. long; spikelets 2.5 to 3.5 cm. long, 3- to 6-flowered; glumes subequal, the first 3-nerved, the second 5- or indistinctly 7-nerved; lemmas broadly lanceolate, 7-nerved, scarious-margined, smooth to scabrous-



FIGURE 5.—*Bromus aleutensis*, $\times 1$. (Evans 550, Alaska.)

pubescent, about 15 mm. long; awn mostly about 1 cm. long. ☉ —Open ground, Aleutian Islands to the Olympic Mountain region.

4. *Bromus breviaristátus* Buckl. (Fig. 6.) Erect tufted perennial; culms 25 to 50 cm. tall; sheaths canescent to densely retrorse-pilose; blades narrow, becoming involute, canescent and also pilose with spreading hairs, mostly erect or ascending, often only 1 to 2 mm. wide; panicle narrow, erect, 5 to 15 cm. long, the branches short, appressed, often bearing only 1 spikelet; spikelets 2 to 3 cm. long; lemmas appressed-puberulent; awn 3 to 10 mm. long. ☉ (*B. subvelutinus* Shear.)—Dry wooded hills and meadows, Wyoming to British Columbia, eastern Washington, Nevada, and California.

5. *Bromus carinátus* Hook. and Arn. CALIFORNIA BROME. (Fig. 7.) Erect annual or mostly biennial; culms mostly 50 to 100 cm. (occasionally to 120 cm.) tall; sheaths scabrous to rather sparsely pilose; blades flat, mostly 20 to 30 cm. long, the lower shorter (those of the innovations numerous), scabrous or sparsely pilose,

mostly 3 to 10 mm. wide; panicle mostly 15 to 30 cm. long, with spread-

ing or drooping branches, in small plants much reduced; spikelets (excluding awns) 2 to 3 cm. long, mostly 6- to 10-flowered, the florets in anthesis not or scarcely overlapping, exposing the relatively long rachilla joints; glumes acuminate, the first 6 to 9 mm., the second 10 to 15 mm., long; lemmas minutely appressed-pubescent to glabrous, about 2 to 2.5 mm. wide as folded, 10 to 20 mm. long; awn 7 to 15 mm. long; palea acuminate, nearly as long as the lemma, the teeth short-awned. ☉ —Open ground, open woods, and waste places, at low and middle altitudes, common on the Pacific coast, British Columbia to Idaho and California; New Mexico and Baja California. The species is extremely variable in size, in shape of panicle, and in pubescence, and intergrades freely with the following.⁸

6. *Bromus arizonicus* (Shear) Stebbins. Annual, similar to the preceding, commonly shorter; panicle mostly



FIGURE 6.—*Bromus breviaristatus*. Plant, $\times \frac{1}{2}$; spikelet, $\times 5$. (Nuttall, Rocky Mts.)

⁸ For variability in *Bromus carinatus* see HARLAN, J. R., Amer. Jour. Bot. 32: 142. 1945. For proposed varieties see SHEAR, C. L., U. S. Dept. Agr., Div. Agrost. Bul. 23. 1900. See also STEBBINS, G. L., TOBGY, H. A., and HARLAN, J. R., Calif. Acad. Sci. Proc. 25: 307-321. 1944.



FIGURE 7.—*Bromus carinatus*, $\times 1$. (Hitchcock 2704, Calif.)

stiff, erect and relatively narrow; spikelets mostly 5- to 7-flowered; glumes less unequal, the second often equalling the length of the lowest lemma; lemmas hirsute toward the margin, occasionally sparsely so across the back, the teeth of the apex 0.7 to 2 mm. long. ☉ —Open, mostly arid slopes and valleys, western Texas; Arizona to middle California and Baja California. Plants short-lived, flowering in the early spring rains and dying after seeding.

7. *Bromus marginatus* Nees. (Fig. 8.) Perennial, sheaths mostly conspicuously retrorsely pilose; blades commonly pubescent, 6 to 12 mm. wide; panicles usually less open than in *B. carinatus*; spikelets mostly



FIGURE 8.—*Bromus marginatus*, $\times 1$. (Hunter 555, Oreg.)

closely flowered, lemmas more strongly pubescent, awns usually less than 7 mm. long. ☉ —Open woods, open or wooded slopes, meadows, and waste places, British Columbia and Alberta to South Dakota, New Mexico, and California, mostly on the eastern slope; adventive in Maine (in wool waste); introduced in Illinois,

Iowa, and Kansas. Variable, intergrading with *B. carinatus* and scarcely distinct, though extremes are very different in appearance.

8. *Bromus maritimus* (Piper) Hitchc. Perennial; culms stout, 25 to 70 cm. tall, geniculate at base with numerous basal shoots; sheaths smooth or scaberulous; blades mostly 6 to 8 mm. wide, scabrous; panicle mostly 10 to 20 cm. long, the branches short, erect; spikelets 3 to 4 cm. long. ☉ (*B. marginatus maritimus* Piper.) —Near the coast, Lane County, Oreg., to Monterey County, Calif.

9. *Bromus polyanthus* Scribn. (Fig. 9.) Perennial; culms robust, mostly 90



FIGURE 9.—*Bromus polyanthus*, $\times 1$. (Chase 5349, Colo.)

to 125 cm. tall; sheaths glabrous; blades 6 to 15 mm. wide, scabrous; panicles commonly 15 to 25 cm. long, the branches ascending; spikelets glabrous or scaberulous, somewhat glossy, rather loose at anthesis; awns 4 to 6 mm. long. ☉ —Open or sparsely wooded slopes, foothills, moist ground, Montana to Washington, south to Texas and California (Yosemite National Park); Kansas (experiment station).

BROMUS LACINIATUS Beal. Tall slender perennial; blades flat; panicles 20 to 30 cm. long, open, drooping; spikelets flattened, about 3 cm. long, mostly purplish; lemmas keeled, awned. ☉ (*B. pendulinus* Sessé, not

Schrad.)—Occasionally cultivated for ornament; Mexico.

SECTION 2. BROMOPSIS Dum.

Perennials; panicles mostly open; spikelets rather elongate, subterete or slightly compressed before flowering; florets closely overlapping.

10. *Bromus inermis* Leyss. SMOOTH BROME. (Fig. 10.) Culms erect, 50 to 100 cm. tall, from creeping rhizomes; ligule 1.5 to 2 mm. long; blades smooth or nearly so, 5 to 10 mm. wide; panicle 10 to 20 cm. long, erect,



FIGURE 10.—*Bromus inermis*. Plant, $\times \frac{1}{2}$; spikelet, $\times 2\frac{1}{2}$. (Deam 11633, Ind.)

the branches whorled, spreading in flower, contracted at maturity; spikelets 2 to 2.5 cm. long, subterete before flowering; first glume 4 to 5 mm. long, the second 6 to 8 mm. long; lemmas 9 to 12 mm. long, glabrous or somewhat scabrous, rarely villous, obtuse, emarginate, mucronate, or with an awn 1 to 2 mm. long. $\text{\textcircled{2}}$ —Cultivated as hay and pasture grass, especially from Minnesota and Kansas to Washington and California, occasionally eastward to Michigan and Ohio and south to New Mexico and Arizona, now running wild in these regions; introduced along roads and in waste places in the northern half of the United States; occasionally southward. Also used for reseeding western mountain ranges. Introduced from Europe.

11. *Bromus pumpelliánus* Scribn. (Fig. 11.) Resembling *B. inermis*; culms 50 to 120 cm. tall, from creeping rhizomes; sheaths glabrous or pubescent; blades rather short, mostly glabrous beneath, scabrous or somewhat pubescent on upper surface; panicle 10 to 20 cm. long, rather narrow, erect, the branches short, erect, or ascending; spikelets 7- to 11-flowered, 2 to 3 cm. long; first glume 1-nerved, the second 3-nerved; lemmas 10 to 12 mm. long, 5- to 7-nerved, pubescent along the margin and across the back at base, slightly emarginate; awn mostly 2 to 3 mm. long. $\text{\textcircled{2}}$ —Meadows and grassy slopes, Colorado to the Black Hills of South Dakota, Idaho, and Alaska; introduced in Michigan. *BROMUS PUMPELLIANUS* var. *TWEÉDYI* Scribn. Differing in having lemmas more densely pubescent. $\text{\textcircled{2}}$ —Alberta to Colorado.

12. *Bromus eréctus* Huds. Culms tufted, erect, 60 to 90 cm. tall, slender; sheaths sparsely pilose or glabrous; ligule 1.5 mm. long; blades narrow, sparsely pubescent; panicle 10 to 20 cm. long, narrow, erect, the branches ascending or erect; spikelets 5- to 10-flowered; glumes acuminate, the first 6 to 8 mm., the second 8 to

10 mm. long; lemmas 10 to 12 mm. long, glabrous or evenly scabrous-pubescent over the back; awn 5 to 6

mm. long. ♀ —Established in a few localities from Maine to New York; also in Washington, California, Wisconsin, West Virginia, Kentucky, and Alabama; introduced from Europe.

BROMUS RAMÓSUS Huds. Tall slender perennial; blades flat; panicles 15 to 25 cm. long, open, drooping; spikelets 2 to 3 cm. long, lemmas 12 to 15 mm. long, awned. ♀ —Introduced in Washington; Europe.

13. Bromus suksdórfii Vasey. (Fig. 12.) Culms 60 to 100 cm. tall; panicle 7 to 12 cm. long, the branches erect or ascending; spikelets about 2.5 cm. long, longer than the pedicels; first glume mostly 1-nerved, 8 to 10 mm. long, the second 3-nerved, 8 to 12 mm. long; lemmas 12 to 14 mm. long, appressed-pubescent near the margin and on the lower part of midnerve; awn 2 to 4 mm. long. ♀ —Rocky woods and slopes, Washington to the



FIGURE 12.—*Bromus suksdorfii*, $\times 1$. (Type.)



FIGURE 11.—*Bromus pumpellianus*, $\times 1$. (Umbach 453, Mont.)

southern Sierra Nevada of California; Nevada (Lake Tahoe).

14. *Bromus orcuttianus* Vasey. (Fig. 13.) Culms 80 to 120 cm. tall, erect, leafy below, nearly naked above, pubescent at and below the nodes; sheaths pilose or more or less velvety or sometimes glabrous; blades rather short and erect; panicle 10 to 15 cm. long, narrow-pyramidal, the few rather rigid short branches finally divaricate; spikelets about 2 cm. long, not much flattened, on short pedicels; glumes narrow, smooth, or scabrous,

the first 6 to 8 mm. long, acute, 1-nerved, or sometimes with faint lateral nerves, the second 8 to 10 mm. long, broader, obtuse, 3-nerved; lemmas 10 to 12 mm. long, narrow, inrolled at margin, obscurely nerved, scabrous or scabrous-pubescent over the back; awn 5 to 7 mm. long. 2♂ —Open woods, Washington to California; Arizona.

BROMUS ORCUTTIANUS var. *HÁLLII* Hitchc. Blades soft-pubescent on both surfaces; glumes and lemmas pubescent. 2♂ —Dry, mostly wooded

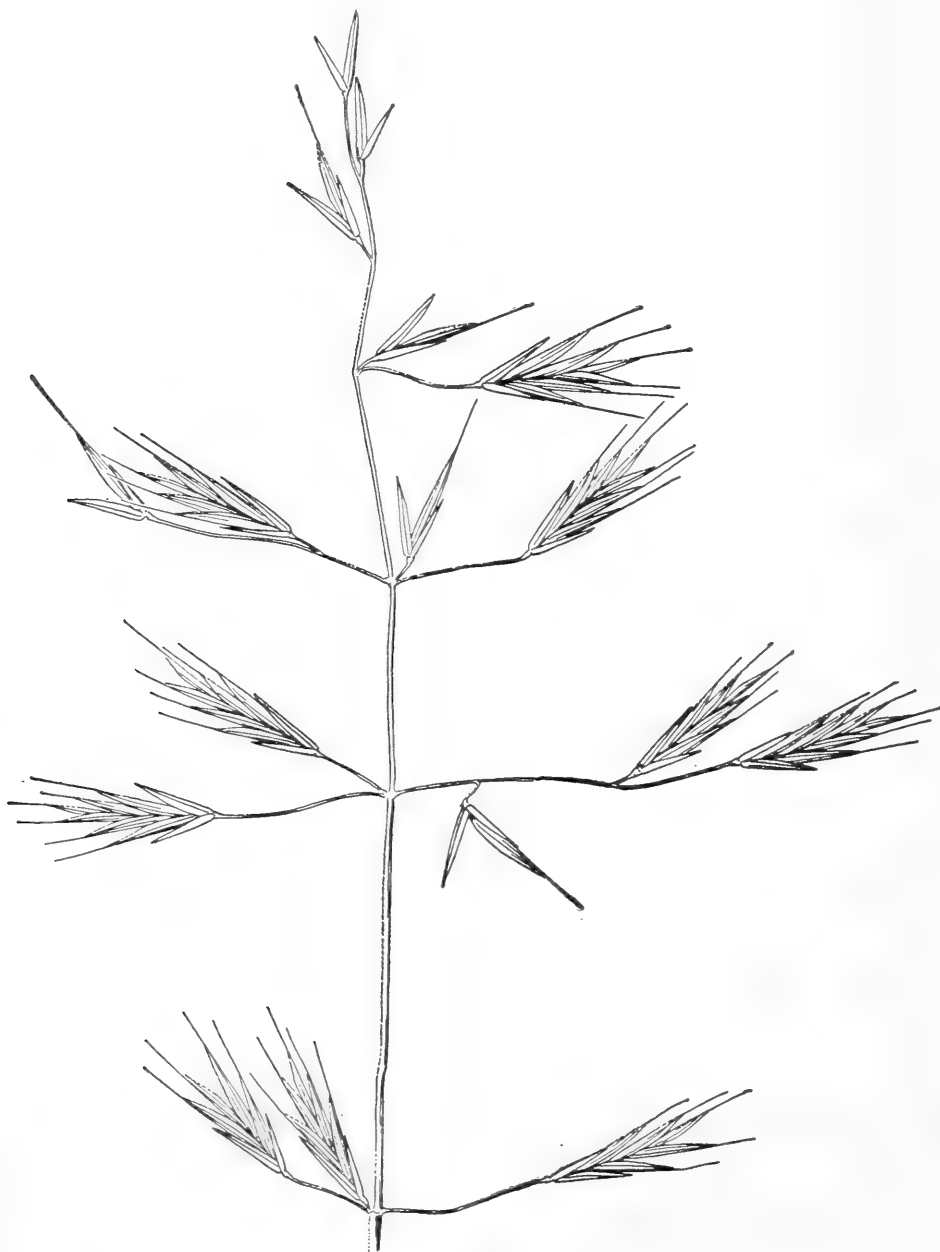


FIGURE 13.—*Bromus orcuttianus*, $\times 1$. (Type.)

ridges and slopes, 1,500 to 3,000 m. elevation, California.

15. *Bromus grandis* (Shear) Hitchc. (Fig. 14.) Culms 1 to 1.5 m. tall; sheaths softly retrorsely pubescent; blades elongate, rather lax, spreading, densely short-pubescent on both surfaces; panicle 15 to 20 cm. long, broad, open, the branches slender, drooping, naked below, the lower usually in pairs, as much as 15 cm. long; spikelets 2 to 2.5 cm. long, on subflexuous pedicels; first glume usually distinctly 3-nerved, the second

10 mm. wide; panicle very open, 10 to 20 cm. long, the branches slender, drooping; spikelets 2 to 2.5 cm. long, coarsely pubescent throughout; lemmas 11 to 12 mm. long, the pubescence somewhat dense on the margin; awn 4 to 6 mm. long. ♀ —Moist thickets near the coast, southern Alaska to western Oregon.

17. *Bromus laevipes* Shear. (Fig. 16.) Light green or glaucous; culms 50 to 100 cm. tall, from a decumbent base, often rooting at the lower nodes; sheaths and blades glabrous; ligule 2



FIGURE 14.—*Bromus grandis*, × 1. (Johnston 1407, Calif.)



FIGURE 15.—*Bromus pacificus*, × 1. (Elmer 1957, Wash.)

3-nerved; lemmas 12 to 15 mm. long, densely pubescent all over the back; awn 5 to 7 mm. long. ♀ —Dry hills at moderate altitudes, Monterey and Madera Counties, Calif., south to San Diego.

16. *Bromus pacificus* Shear. (Fig. 15.) Culms 1 to 1.5 m. tall, stout, erect, pubescent at the nodes; sheaths sparsely pilose; ligule 3 to 4 mm. long; blades sparsely pilose on upper surface, scabrous or smooth beneath, 8 to

to 3 mm. long; blades 4 to 8 mm. wide; panicles broad, 15 to 20 cm. long, the branches slender, drooping; first glume 3-nerved, 6 to 8 mm. long, the second 5-nerved, 10 to 12 mm. long; lemmas obtuse, 7-nerved, 12 to 14 mm. long, densely pubescent on the margin nearly to the apex and on the back at base; awn 3 to 5 mm. long. ♀ —Moist woods and shady banks, southern Washington to California.

FIGURE 16.—*Bromus laevipes*, $\times 1$. (Amer. Gr. Natl. Herb. 866, Calif.)

18. *Bromus vulgaris* (Hook.) Shear (Fig. 17.) Culms slender, 80 to 120 cm. tall, the nodes pubescent; sheaths pilose; ligule 3 to 5 mm. long; blades more or less pilose, to 12 mm. wide; panicle 10 to 15 cm. long, the branches slender, drooping; spikelets narrow, about 2.5 cm. long; glumes narrow,

over the back, more densely near the margin, or nearly glabrous; awn 6 to 8 mm. long. ♀ —Rocky woods and shady ravines, western Montana and Wyoming to British Columbia and California. Two scarcely distinct robust varieties have been described: *B. vulgaris* var. *eximius* Shear, a form with glabrous sheaths and nearly glabrous lemmas, Washington to Mendocino County, Calif.; and *B. vulgaris* var. *robustus* Shear, with pilose sheaths and large panicle, British Columbia to Oregon.

19. *Bromus ciliatus* L. FRINGED BROME. (Fig. 18.) Culms slender, 70 to 120 cm. tall, glabrous or pubescent at the nodes; sheaths glabrous or the lower short-pilose, mostly shorter than the internodes; blades rather lax, as much as 1 cm. wide, sparsely pilose on both surfaces to glabrous; panicle 15 to 25 cm. long, open, the branches slender, drooping, as much as 15 cm. long; first glume 1-nerved, the second 3-nerved; lemmas 10 to 12 mm. long, pubescent near the margin on the lower half to three-fourths, glabrous or nearly so on the back; awn 3 to 5 mm. long. ♀ —Moist woods and rocky slopes, Newfoundland to Washington, south to New Jersey, Tennessee, Iowa, western Texas, and southern California (San Bernardino Mountains); Mexico. *B. richardsoni* Link is a form that has been distinguished by its larger spikelets and lemmas and more robust habit, but it grades freely into *B.*

FIGURE 17.—*Bromus vulgaris*, $\times 1$. (Chase 4945, Wash.)

the first acute, 1-nerved, 5 to 8 mm. long, the second broader, longer, obtuse to acutish, 3-nerved; lemmas 8 to 10 mm. long, sparsely pubescent



FIGURE 18.—*Bromus ciliatus*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Hitchcock, Vt.)

ciliatus and can scarcely be ranked even as a variety. This is the common form in the Rocky Mountains.

20. *Bromus púrgans* L. CANADA BROME. (Fig. 19.) Resembling *B. ciliatus*; nodes mostly 4 to 6; sheaths, except the lower 1 or 2, shorter than the internodes, more or less retrorsely pilose, or sometimes all glabrous; blades elongate, 5 to 17 mm. wide, narrowed at base, and without flanges or auricles; pubescence of lemma nearly uniform, sometimes more dense on the margins, sometimes sparse and short on the back or scabrous only. ♀ —Moist woods and rocky slopes, Massachusetts to North Dakota, south to northern Florida and Texas.



FIGURE 19.—*Bromus púrgans*. Floret, $\times 5$. (Deam 27982, Ind.)



purgans in having usually 10 to 20 nodes; sheaths overlapping, more or less pilose, especially about the throat and collar; base of blades with prominent flanges on each side, these usually prolonged into auricles. Where the ranges of *B. purgans* and *B. latiglumis* overlap, the latter flowers several weeks later than the former. ♀ —Alluvial banks of streams, Quebec and Maine to North Dakota, south to North Carolina and Kansas.

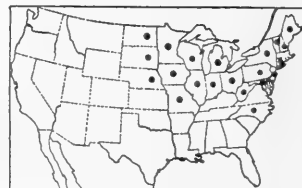


FIGURE 20.—*Bromus latiglumis*. Base of blades, $\times 1$. (Type.)

BROMUS LATIGLUMIS f. INCÁNUS (Shear) Fernald. Culms 1 to 2 m. tall, decumbent below, mostly somewhat weak and sprawling; sheaths densely canescent; panicles rather heavy. ♀ —Low woods, Indiana, Illinois, Michigan, and Maryland.

22. *Bromus nottowayánu* Fernald. (Fig. 21.) Resembling *B. latiglumis*, but with fewer nodes; sheaths mostly longer than the internodes, usually retrorsely pilose, without flanges at the mouth; ligule very short; blades elongate, 6 to 13 mm. wide, pilose above, some sparsely so beneath; panicles 12 to 22 cm. long, the slender branches drooping, the pulvini inconspicuous; first glume 1- to 3-nerved, the second 5-nerved; lemma 8 to 13 mm. long, densely appressed-pilose, the awn 5 to 8 mm. long. ♀ —Rich woods, Indiana and Illinois; Maryland to North Carolina; Tennessee; Arkansas.

BROMUS PURGANS var. LAEVIGLÚMIS (Scribn.) Swallen. Culms stout, leafy, mostly more than 1 m. tall; sheaths shorter or longer than the internodes, glabrous to pubescent, not strongly pilose; blades elongate, as much as 1 cm. wide or even wider; panicle large, open; lemmas glabrous or nearly so. ♀ —Woods and river banks, rare. Known from Quebec, Ontario, Maine, Vermont, Connecticut, New York, Michigan, Wisconsin, Maryland, West Virginia, and North Carolina.

21. *Bromus latiglúmis* (Shear) Hitchc. (Fig. 20.) Differing from *B.*

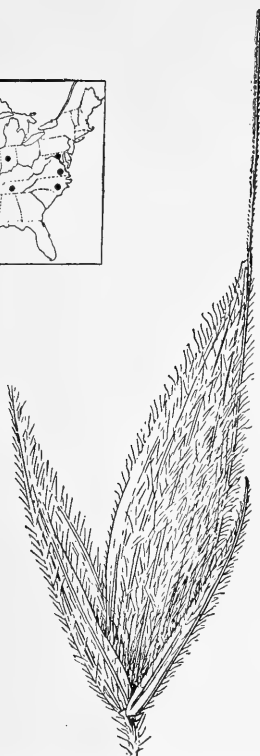
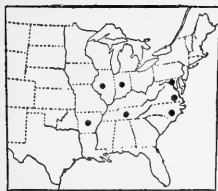


FIGURE 21.—*Bromus nottowayanus*. Glumes and lower floret, $\times 5$. (Type number.)

23. *Bromus texensis* (Shear) Hitchc. (Fig. 22.) Culms slender, mostly solitary, 40 to 70 cm. tall; sheaths

much shorter than the internodes, softly retrorsely pilose; blades pubescent on both surfaces, rarely gla-



FIGURE 22.—*Bromus texensis*, $\times 1$. (Tracy 8881, Tex.)

brous, mostly 3 to 6 mm. wide; panicle mostly not more than 12 cm. long, few-flowered, drooping; lemmas scabrous to nearly smooth; awn 5 to 7 mm. long. 21 —Among brush, Texas (Bexar County and Corpus Christi) and Cochise County, Ariz.; apparently rare; northern Mexico.



FIGURE 23.—*Bromus anomalus*, $\times 1$. (Pammel, Colo.)

24. *Bromus anomalus* Rupr. NODDING BROME. (Fig. 23.) Culms slender, 30 to 60 cm. tall, the nodes pubescent; sheaths sparsely pilose to glabrous; ligule about 1 mm. long; blades scabrous, mostly 2 to 4 mm. wide; panicle about 10 cm. long, often less, few-flowered, drooping; first glume 3-nerved, the second 5-nerved, lemmas about 12 mm. long, evenly and densely pubescent over the back; awn 2 to 4 mm. long. ♀ (*B. porteri* Nash.)—Open woods, Saskatchewan to North Dakota and south to western Texas, southern California, and Mexico.

BROMUS ANOMALUS var. LANÁTIPES (Shear) Hitchc. More robust, with woolly sheaths and usually broader blades. ♀ (*B. porteri lanatipes* Shear.)—Colorado to western Texas and Arizona.

lets; first glume 3-nerved, the second 5-nerved; lemmas 7 to 10 mm. long, villous over the back, more densely so near the margins; awn 2 to 3 mm. long. ♀ —Dry or sandy ground and open woods, Maine to Minnesota and South Dakota, south to western Maryland and Iowa. Called wild chess.

26. *Bromus frondosus* (Shear) Woot. and Standl. (Fig. 25.) Culms erect to weakly reclining, 80 to 100 cm. tall; sheaths glabrous or the lower pilose; blades pale green, scabrous, mostly less than 5 mm. wide, occasionally to 10 mm., rarely wider; panicle open, drooping, the slender lower branches naked below; first glume 2- to 3-nerved; lemmas pubescent all over, rarely nearly glabrous. ♀ (*B. porteri* var. *frondosus* Shear.)—Open woods and rocky slopes,

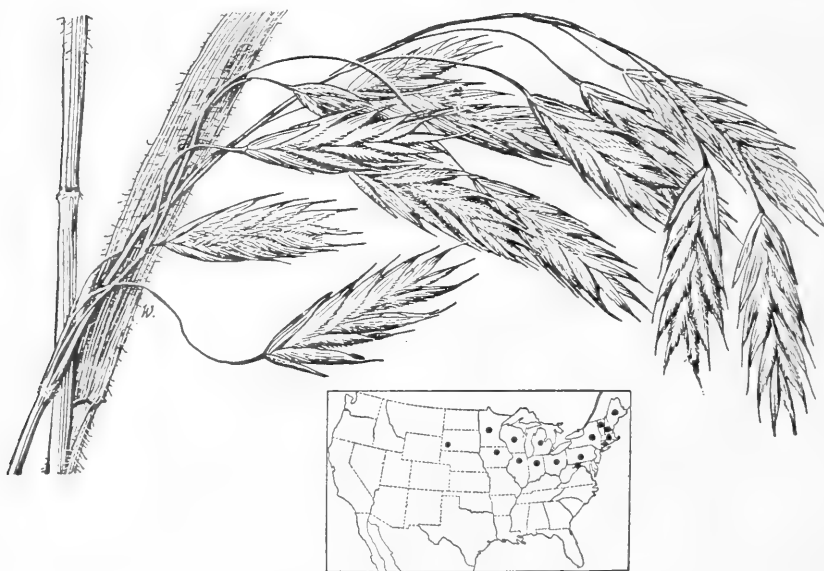


FIGURE 24.—*Bromus kalmii*, $\times 1$. (Chase 1866 $\frac{1}{2}$, Ind.)

25. *Bromus kalmii* A. Gray. (Fig. 24.) Culms slender, 50 to 100 cm. tall, usually pubescent at and a little below the nodes; sheaths usually shorter than the internodes, pilose or the upper glabrous; blades usually sparsely pilose on both surfaces, 5 to 10 mm. wide; panicle rather few-flowered, drooping, mostly 5 to 10 cm. long, the branches slender, flexuous, bearing usually 1 to 3 spike-

lets. Colorado, Utah, New Mexico, and Arizona.

SECTION 3. BRÓMIUM Dum.

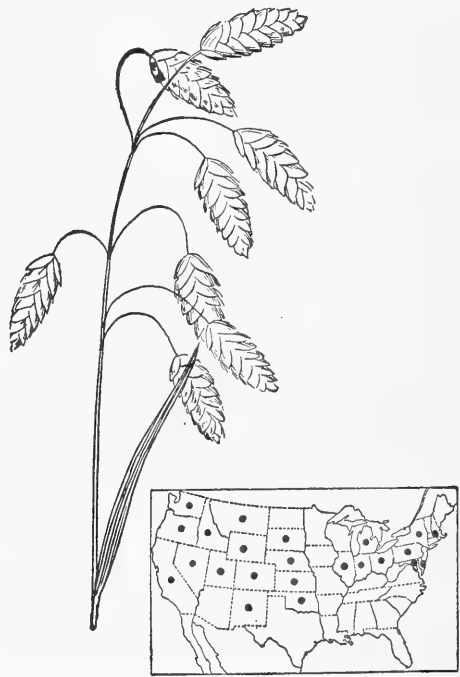
Annuals; spikelets subcompressed; glumes and lemmas comparatively broad, elliptic or oblong-elliptic. Introduced, mostly from Europe.

27. *Bromus brizaefórmis* Fisch. and Mey. RATTLESNAKE CHESS. (Fig.

FIGURE 25.—*Bromus frondosus*, $\times 1$. (Hitchcock 13282, N. Mex.)

26.) Culms 30 to 60 cm. tall; sheaths and blades pilose-pubescent; panicle 5 to 15 cm. long, lax, secund, drooping; spikelets rather few, oblong-ovate, 1.5 to 2.5 cm. long, about 1 cm. wide; glumes broad, obtuse, the first 3- to 5-nerved, the second 5- to 9-nerved, about twice as long as the first; lemmas 10 mm. long, very broad, inflated, obtuse, smooth, with a broad scarious margin, nearly or quite awnless. ☉ —Sandy fields and waste ground, Canada and Alaska; occasional from Washington, Montana, and Wyoming to California, rare eastward to Massachusetts and Delaware; introduced from Europe. Sometimes cultivated for ornament.

28. *Bromus secalinus* L. CHES. (Fig. 27.) Culms erect, 30 to 60 cm. tall; foliage glabrous or the lower sheaths sometimes puberulent; panicle pyramidal, nodding, 7 to 12 cm. long, the lower branches 3 to 5, unequal, slightly drooping; spikelets ovoid-lanceolate, becoming somewhat turgid at maturity, 1 to 2 cm. long, 6 to 8 mm. wide; glumes obtuse, the first 3- to 5-nerved, 4 to 6 mm. long, the second 7-nerved, 6 to 7 mm. long; lemmas 7-nerved, 6 to 8 mm. long, elliptic, obtuse, smooth or scabrous, the margin strongly involute at maturity, shortly bidentate at apex, the undulate awns usually

FIGURE 26.—*Bromus brizaeformis*, $\times \frac{1}{2}$. (Leckenby 40, Wash.)

3 to 5 mm. long, sometimes very short or obsolete; palea about as long as lemma. ☉ —Introduced from Europe, a weed in grainfields and waste places, more or less throughout the United States. Also called cheat. Occasionally utilized for hay in Washington and Oregon. In fruit the turgid florets are somewhat distant so that, viewing the spikelet side-wise, the light passes through the small openings at base of each floret. **BROMUS SECALINUS** var. **VELUTINUS**



FIGURE 27.—*Bromus secalinus*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. Chase, Ill.)

(Schrud.) Koch. Spikelets pubescent. ☉ —Oregon (Corvallis, The Dalles). Europe.

The species of the group containing *Bromus secalinus*, *B. commutatus*, *B. mollis*, and *B. racemosus* are closely allied, differentiated only by arbitrary characters. The forms are recognized as species in most recent European floras and this disposition is here followed.

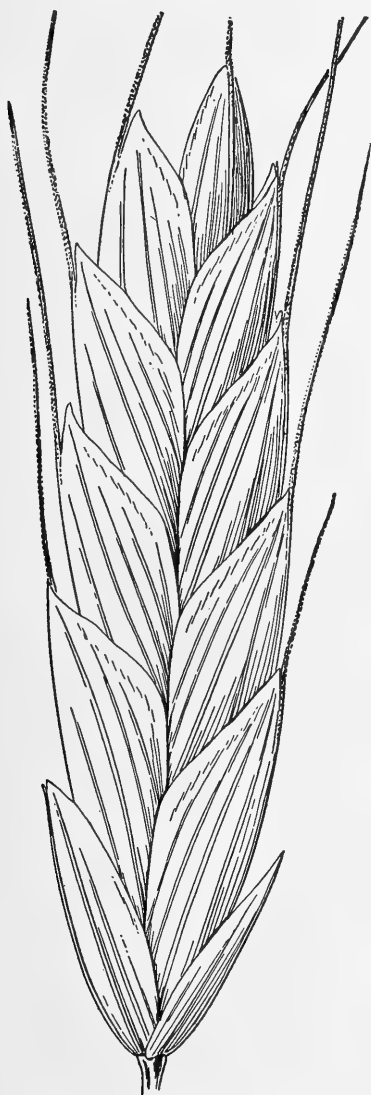


FIGURE 28.—*Bromus commutatus*, $\times 5$. (Amer. Gr. Natl. Herb. 890, Va.)

29. *Bromus commutatus* Schrad. HAIRY CHESS. (Fig. 28.) Resembling *B. secalinus*, but the sheaths retrorse-pilose; the blades more or less pubescent; lemmas at maturity less

plump and more overlapping; awn commonly somewhat longer. ☉ — Introduced from Europe, a weed in fields and waste places, Washington to California, Montana, and Wyoming, eastward through the Northern States, thence less commonly southward. *BROMUS COMMUTATUS* var. *APRICORUM* Simonkai. Lemmas pubescent. ☉ —Washington, Nevada, and California; rare. Introduced from Europe.

30. *Bromus mollis* L. SOFT CHESS. (Fig. 29.) Softly pubescent throughout; culms erect, 20 to 80 cm. tall; panicle erect, contracted, 5 to 10 cm. long, or, in depauperate plants, reduced to a few spikelets; glumes broad, obtuse, coarsely pilose or scabrous-pubescent, the first 3- to 5-nerved, 4 to 6 mm. long, the second 5- to 7-nerved, 7 to 8 mm. long; lemmas broad, soft, obtuse, 7-nerved,

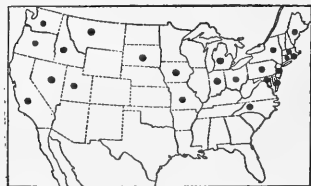


FIGURE 29.—*Bromus mollis*, $\times 1$. (Hall 258, Calif.)

coarsely pilose or scabrous-pubescent, rather deeply bidentate, 8 to 9 mm. long, the margin and apex hyaline; awn rather stout, 6 to 9 mm. long; palea about three-fourths as long as lemma. ☉ —Weed in waste

places and cultivated soil, introduced from Europe, Canada, and Alaska, abundant on the Pacific coast, occasional eastward to Nova Scotia and south to North Carolina. This has been referred to *B. hordeaceus* L., a distinct European species.

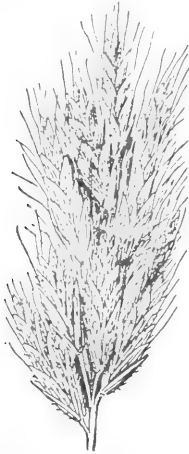


FIGURE 30.—*Bromus molliformis*, $\times 1$. (Chase 5564, Calif.)

31. *Bromus molliformis* Lloyd. (Fig. 30.) Culms erect, mostly 10 to 20 cm. tall, sometimes taller; lower sheaths felty-pubescent, the upper glabrous; blades narrow, the upper surface with scattered rather stiff hairs; panicle 2 to 4 cm. long, ovoid, dense, few-flowered; spikelets oblong, compressed, 12 to 18 mm. long; glumes about 6 mm. long, the second broader, loosely pilose, the hairs spreading; lemmas thinner and narrower than in *B. mollis*, closely imbricate, about 8 mm. long, appressed-pilose, the margin whitish; awn from below the entire apex, 5 to 7 mm. long; palea a little shorter than the lemma; anthers 0.4 mm. long, about as broad. ☉ —Open ground, southern California; Texas (College Station); introduced from Europe.

32. *Bromus racemosus* L. (Fig. 31.) Differing from *B. mollis* in the somewhat more open panicle and glabrous or scabrous lemmas. ☉ (Including what in this country has been called *B. hordeaceus glabrescens* Shear, *B. hordeaceus* var. *leptostachys* Beck, and *B. mollis* f. *leiostachys*

Fernald.)—Weed in waste places, chiefly on the Pacific coast and east to Montana, Colorado, and Arizona; a few points from Wisconsin and Illinois to Maine and North Carolina; introduced from Europe.

***Bromus scoparius* L.** Resembling *B. molliformis*; culms 20 to 30 cm. tall; sheaths soft-pubescent; blades glabrous, scabrous or sparingly pilose; panicle contracted, erect, 3 to 7 cm. long; spikelets about 1.5 cm. long, 3 to 4 mm. wide; lemmas about 7 mm. long, narrow, glabrous; awn 5 to 8 mm. long, finally divaricate. ☉ —Introduced from Europe in California (Mariposa), Virginia (Newport News, on ballast), and Michigan (Schoolcraft).

***Bromus macröstachys* Desf.** Annual; culms erect, 30 to 60 cm. tall; panicle narrow, compact, consisting of a few large coarsely pilose, awned spikelets about 3 cm. long. ☉ —Wool waste, Yonkers, N. Y., and College Station, Tex. Sometimes cultivated for ornament. Mediterranean region.

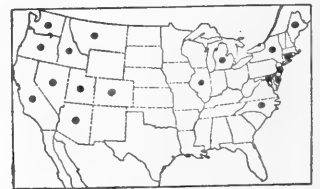
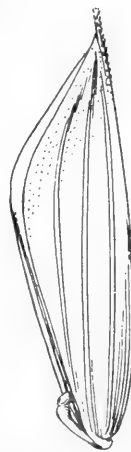


FIGURE 31.—*Bromus racemosus*, $\times 5$. (Hitchcock 2667, Calif.)

33. *Bromus squarrosus* L. (Fig. 32.) Culms mostly 20 to 30 cm. tall, erect; sheaths and blades softly and densely pubescent; blades 5 to 15 cm. long, 2 to 4 mm. wide, usually erect; panicles nodding, the relatively coarse, short branches subverticillate, flexuous, bearing 1 or 2 large spikelets; spikelet about 2 cm. long, 5 to 8 mm. wide, somewhat inflated; awns

flat, spreading or recurved, about 1 cm. long. ☉ —Waste places, Michigan and North Dakota. Introduced from Europe.

34. *Bromus japonicus* Thunb.
JAPANESE CHESS. (Fig. 33.) Culms erect or geniculate at base, 40 to 70 cm. tall; sheaths and blades pilose; panicle 12 to 20 cm. long, broadly pyramidal, diffuse, somewhat drooping, the slender lower branches 3 to 5, all the branches more or less flexuous; glumes rather broad, the first acute, 3-nerved, 4 to 6 mm. long, the second obtuse, 5-nerved, 6 to 8 mm. long; lemmas broad, obtuse, smooth, 7 to 9 mm. long, 9-nerved, the marginal pair of nerves faint, the hyaline margin obtusely angled above the middle, the apex blunt, emarginate; awn 8 to 10 mm. long, usually somewhat twisted and flexuous at maturity, those of the lower florets shorter than



FIGURE 32.—*Bromus squarrosus*, × 1. (Hanes 688, Mich.)



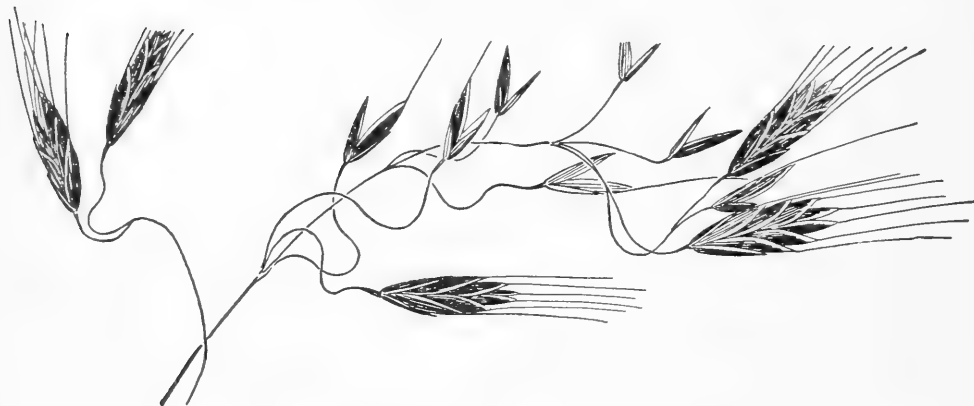
FIGURE 33.—*Bromus japonicus*, × 1. (Deam 6833, Ind.)

the upper; palea 1.5 to 2 mm. shorter than the lemma. ☉ (*B. patulus* Mert. and Koch)—Weed in waste places, Vermont to Washington, south to North Carolina and California; Alberta; widely distributed in the Old World, whence introduced.

BROMUS JAPONICUS VAR. PORRECTUS Hack. Differing only in straight awns. ☉ —New York to Utah and New Mexico infrequent; more common from Maryland to Alabama. In some

mature panicles both straight and flexuous-divergent awns occur. In *B. japonicus* before maturity the awns are straight and identity is often uncertain. Specimens of this have been distributed as *B. japonicus* var. *sub-squarrosus*.

35. *Bromus arvensis* L. (Fig. 34.) Resembling *B. japonicus*, foliage downy to subglabrous; spikelets thinner, flatter (less turgid), often tinged with purple; lemmas acute, bifid; awn

FIGURE 34.—*Bromus arvensis*, $\times 1$. (Gray, Md.)FIGURE 35.—*Bromus arenarius*, $\times 1$. (Pendleton 1459, Calif.)

straight or nearly so in drying; palea as long as the lemma or only slightly shorter. ☉ —Open ground, cultivated soil, New York, Maryland; North Dakota, Nevada, Arizona, and California.

36. *Bromus arenarius* Labill. AUSTRALIAN CHESS. (Fig. 35.) Culms slender, 15 to 40 cm. tall, sheaths and blades pilose; panicle open, pyramidal, nodding, 8 to 11 (rarely 15) cm. long, the spreading branches and pedicels sinuously curved; glumes densely pilose, acute, scarious-margined, the first narrower, 3-nerved, 8 mm. long, the second 7-nerved, 10 mm. long; lemmas densely pilose, 7-nerved, 10 mm. long; awn straight, 10 to 16 mm. long. ☉ —Sandy roadsides, gravelly or sterile hills, Oregon, California, Nevada, and Arizona; adventive at Philadelphia, Pa.; introduced from Australia.

***Bromus alopecúros* Poir.** Weedy annual 20 to 40 cm. tall; foliage softly pubescent; panicle narrow, dense, 5 to 10 cm. long; spikelets short-pedicellate, about 2 cm. long, the

glumes and lemmas softly pubescent, the awn of the lemma, flat, twisted at the base, spreading, 1.5 to 2 cm. long. ☉ —Adventive in waste ground, Ann Arbor, Mich. Mediterranean region.

SECTION 4. EUBRÓMUS Godr.

Tufted annuals; spikelets compressed; glumes and lemmas narrow, long-awned; first glume 1-nerved, the second 3-nerved; lemma 5- to 7-nerved, cleft at the apex, the hyaline teeth 2 to 5 mm. long; floret at maturity with a sharp hard point or callus. Introduced from Europe.

37. *Bromus rigidus* Roth. RIGID GRASS. (Fig. 36.) Culms 40 to 70 cm. tall; sheaths and blades pilose; panicle open, nodding, rather few-flowered, 7 to 15 cm. long, the lower branches 1 to 2 cm. long; spikelets usually 5- to 7-flowered, 3 to 4 cm. long, excluding awns; glumes smooth, the first 1.5 to 2 cm. long, the second 2.5 to 3 cm. long; lemmas 2.5 to 3 cm. long, scabrous or puberulent, the teeth 3 to 4

mm. long; awn stout, 3.5 to 5 cm. long. ☉ (*B. villosus* Forsk. not Scop.; *B. maximus* Desf., not Gilib.) —Common weed in open ground and waste places in the southern half of California, forming dense stands over great areas in the lowlands, occasional north to British Columbia and east to Idaho, Utah, and Arizona; rare in the Eastern States, Maryland, Virginia, Mississippi, Texas, introduced from Mediterranean region. Distinguished from the other species of the section by the long awns. *BROMUS RIGIDUS* var. *GUSSÓNEI* (Parl.) Coss. and Dur. Differing in having more open panicles, the stiffer, more spreading lower branches as much as 10 to

12 cm. long. ☉ —Weed like *B. rigidus*, growing in similar places, Washington to California, and Arizona; more common than the species in middle and northern California.

38. *Bromus stérilis* L. (Fig. 37.) Resembling *B. rigidus*, less robust; culms 50 to 100 cm. tall; sheaths pubescent; panicle 10 to 20 cm. long, the branches drooping; spikelets 2.5 to 3.5 cm. long, 6- to 10-flowered; glumes lanceolate-subulate, the first about 8 mm. long; lemmas 17 to 20 mm. long, scabrous or scabrous-pubescent, the teeth 2 mm. long; awn 2 to 3 cm. long. ☉ —Fields and waste places, introduced in a few localities from British Columbia to California and

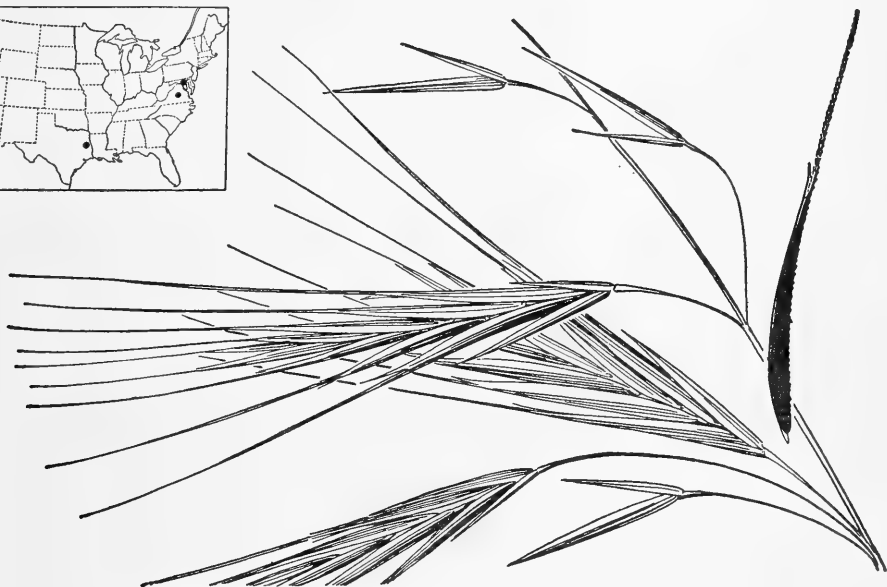


FIGURE 36.—*Bromus rigidus*, $\times 1$. (Tracy 4702, Calif.)

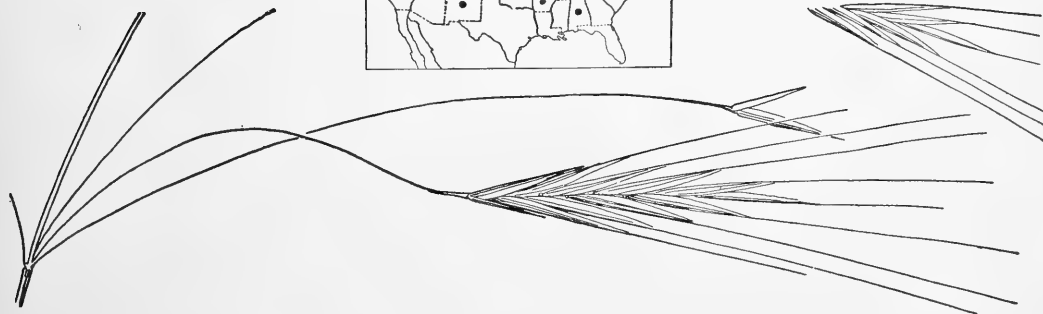


FIGURE 37.—*Bromus stérilis*, $\times 1$. (Boettcher 2423, D. C.)

Colorado, and New Mexico; in the Eastern States from New England and Illinois to Virginia and Arkansas.

39. *Bromus rubens* L. FOXTAIL CHESS. (Fig. 38.) Culms 15 to 40 cm. tall, puberulent below the panicle; sheaths and blades pubescent; panicle erect, compact, ovoid, usually 4 to 8 cm. long, usually purplish; spikelets 4- to 11-flowered, about 2.5 cm. long;



FIGURE 38.—*Bromus rubens*, $\times 1$. (Blankenship 36, Calif.)

first glume 7 to 9 mm. long, the second 10 to 12 mm. long; lemmas scabrous to coarsely pubescent, 12 to 16 mm. long, the teeth 4 to 5 mm. long; awn 18 to 22 mm. long, somewhat spreading at maturity. ☉ —Dry hills and in waste or cultivated ground, Washington to southern California, very abundant over extensive areas, and east to Idaho, Utah, and Arizona; Texas; Massachusetts.

40. *Bromus madritensis* L. (Fig. 39.) Resembling *B. rubens*, but the culms smooth below the less dense panicles; sheaths mostly smooth; blades puberulent to glabrous; panicle 5 to 10 cm. long, oblong-ovoid (in dried specimens more or less fan-



FIGURE 39.—*Bromus madritensis*, $\times 1$. (Eastwood, Calif.)

shaped); lemmas a little longer than in *B. rubens*, the teeth 2 to 3 mm. long; awn rather stout, 16 to 22 mm. long. ☉ —Open ground and waste places, Oregon and California; less common than *B. rubens*. Occasionally cultivated for ornament.

41. *Bromus tectorum* L. DOWNY CHESS. (Fig. 40.) Culms erect or spreading, slender, 30 to 60 cm. tall;



FIGURE 40.—*Bromus tectorum*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Chase 2051, Ind.)

sheaths and blades pubescent; panicle 5 to 15 cm. long, rather dense, soft, drooping, often purple; spikelets nodding, 12 to 20 mm. long; glumes villous, the first 4 to 6 mm. long, the second 8 to 10 mm. long; lemmas lanceolate, villous or pilose, 10 to 12 mm. long, the teeth 2 to 3 mm. long; awn 12 to 14 mm. long. ☉ —Along roadsides, banks, and waste places, common on the Pacific coast, especially in Washington and Oregon; Alberta, and here and there throughout the United States as far south as South Carolina and Texas. *BROMUS TECTORUM* var. *GLABRÁTUS* Spenner. Differing in having glabrous spikelets. ☉ (*B. tectorum* var. *nudus* Klett and Richter.)—About the same range as the species, less common.

SECTION 5. *NEOBROMUS* Shear, as subgenus.

Annual; lemmas lanceolate, deeply bifid, the teeth aristate; awn twisted, geniculate. Approaches *Trisetum*.



FIGURE 41.—*Bromus trinii*, $\times 1$. (Eastwood, Calif.)

42. *Bromus trinii* Desv. CHILEAN CHESS. (Fig. 41.) Culms 30 to 60 cm. or even 100 cm. tall, erect or branched and spreading below, often pubescent at the nodes; sheaths and blades pilose-pubescent to nearly smooth; panicle 8 to 20 cm. long, narrow, rather dense, erect, the branches erect or the lower more or less spreading or flexuous; spikelets narrow, 1.5 to 2 cm. long, 5- to 7-flowered; glumes lanceolate, acumi-

nate, the first mostly 1-nerved, 8 to 10 mm. long, the second mostly 3-nerved, 12 to 16 mm. long; lemmas 5-nerved, 12 to 14 mm. long, pubescent, acuminate, with narrow teeth 2 to 3 mm. long, the teeth aristate; awn 1.5 to 2 cm. long, twisted below, bent below the middle and strongly divaricate when old. ☉ (Including *B. trinii* var. *pallidiflorus* Desv.) —Dry plains and rocky or wooded slopes, Oregon, California, and Baja California, rarely eastward to Colorado; introduced from Chile.

BROMUS TRINII var. *EXCÉLSUS* Shear. Differing in having larger spikelets, 7-nerved lemmas, and divaricate but not twisted or bent awns; teeth of the lemma acuminate, but not aristate. ☉ —A little-known form from the Panamint Mountains, Calif., and Emory Canyon, Lake Mead, Ariz.

3. *BRACHYPODIUM* Beauv.

Spikelets nearly sessile, several- to many-flowered, the rachilla disarticulating above the glumes and between the florets; glumes unequal, sharp-pointed, 5- and 7-nerved; lemmas firm, rounded or somewhat flattened on the back, 7-nerved, acuminate, awned or mucronate; palea as long as the body of the lemma, concave, the keels pectinate-ciliate. Annuals or perennials with erect racemes of subsessile spikelets. Type species, *Bromus pinnatus* L. (*Brachypodium pinnatum* (L.) Beauv.) Name from *brachys*, short, and *podion*, foot, alluding to the very short pedicels.

Eurasian species introduced in the United States; two American species only; Mexico to South America.

1. *Brachypodium distachyon* (L.) Beauv. (Fig. 42.) Annual, branching and geniculate at base, 15 to 30 cm. tall; nodes pubescent; sheaths and blades sparsely pilose to subglabrous; ligule, 1.5 to 2 mm. long, pubescent; blades flat, 2 to 6 cm. long, 3 to 4 mm. wide; raceme strict, the segments of the axis alternately con-

cave; spikelets 1 to 5, imbricate, 2 to 3.5 cm. long, excluding the awns, 5 to 6 mm. wide; florets closely imbricate; lemmas scabrous, the slender scabrous erect awn 1 to 2 cm. long. The spikelets resemble those of some species of *Agropyron*. ☉ —Open ground, Arapahoe County, Colo., Humboldt, Sonoma, and Marin Counties, Calif.; on ballast, Camden, N. J., and Portland, Oreg. Sparingly introduced from Europe, but spreading in Marin County, Calif.

BRACHYPODIUM SYLVATICUM (Huds.) Beauv. Perennial, 60 to 100 cm. tall; blades to 25 cm. long and 1 cm. wide; raceme 12 to 20 cm. long, the spikelets 4 to 5 cm. long, subterete, the lower distant, the upper closely imbricate. ♀. Occasionally cultivated for ornament and in grass gardens. Europe.

BRACHYPODIUM CAESPITOSUM (Host) Roem. and Schult., a tall, leafy perennial, with racemes 8 to 12 cm. long of overlapping spikelets 2.5 to 3 cm. long, the lemmas imbricate, strongly nerved, glabrous, the awns about 5 mm. long. Introduced from Turkey; has been grown at the experiment station, Tucson, Ariz.

BRACHYPODIUM PINNATUM (L.) Beauv., similar to the preceding, but with pubescent nodes, scabrous laxer foliage, and narrower spikelets with hirsute lemmas. Introduced from Rumania; has been grown in the Grass Garden, Beltsville, Md. The results of both trials are as yet inconclusive.



FIGURE 42.—*Brachypodium distachyon*. Plant, $\times \frac{1}{2}$; glumes and floret, $\times 5$. (J. T. Howell 23186, Calif.)

4. FESTUCA L. FESCUE

Spikelets few- to several-flowered (rarely 1-flowered in some of the spikelets of a panicle), the rachilla disarticulating above the glumes and between the florets, the uppermost floret reduced; glumes narrow, acute, unequal, the first sometimes very small; lemmas rounded on the back, membranaceous or somewhat indurate, 5-nerved, the nerves often obscure, acute or rarely obtuse, awned from the tip, or rarely from a minutely bifid apex, sometimes awnless. Low or rather tall annuals or perennials, the spikelets in narrow or open panicles. The blades are sometimes somewhat auriculate as in the *Hordeae*. Standard species, *Festuca ovina*. Name from *Festuca*, an old Latin name for a weedy grass.

Many of the perennial species of fescue are important forage grasses in the grazing regions of the West. *Festuca arizonica*, Arizona fescue, of northern Arizona and *F. idahoensis*, Idaho fescue, of the region from Colorado to central California and northward, are important, though they become rather tough with age. *F. viridula*, greenleaf fescue, locally called mountain bunch-

grass, is an outstanding grass in subalpine regions of the Northwestern States, and *F. thurberi*, Thurber fescue, is important in similar regions from Colorado to Montana. *F. ovina*, sheep fescue, is a good grazing grass though not abundant, but its variety *brachyphylla*, alpine fescue, furnishes much of the forage above timber line from the Rocky Mountains westward. *F. occidentalis*, western fescue, in open woods up to 10,000 feet in the Northwest, and *F. rubra*, red fescue, widely distributed at various altitudes in the West, are valuable in proportion to their abundance.

The most important cultivated species is *F. elatior*, meadow fescue, a native of Europe, used for hay and pasture in the humid region, especially in Tennessee, Missouri, and Kansas. *F. ovina*, and its allies, and *F. rubra*, are cultivated to a limited extent in the Eastern States as lawn or pasture grasses, usually in mixtures.

Plants annual..... SECTION 1. VULPIA.
Plants perennial..... SECTION 2. EUFESTUCA.

Section 1. *Vulpia*

- 1a. Spikelets mostly more than 5-flowered. Lowest lemma 4 to 5 mm. long, the margin inrolled, not scarious..... 1. *F. OCTOFLORA*.
- 1b. Spikelets mostly less than 5-flowered (sometimes 6-flowered in *F. dertonensis* and *F. sciurea*). Lemmas usually scarious-margined.
 - 2a. Panicle narrow, the branches appressed.
 - Lemmas appressed-pubescent over the back, about 3 mm. long..... 2. *F. SCIUREA*.
 - Lemmas glabrous, scabrous or ciliate, not pubescent over the back.
 - Lemmas ciliate toward the apex..... 3. *F. MEGALURA*.
 - Lemmas not ciliate.
 - First glume two-thirds to three-fourths as long as the second.
 - 4. *F. DERTONENSIS*.
 - First glume much shorter than the second, 1 to 2 mm. long..... 5. *F. MYUROS*.
 - 2b. Panicle rather short, the branches and often the spikelets spreading (scarcely spreading in *F. arida*).
 - 3a. Spikelets glabrous.
 - Pedicels appressed; lower branches of the panicle usually finally reflexed; spikelets usually 3- to 5-flowered..... 6. *F. PACIFICA*.
 - Pedicels or nearly all of them finally reflexed, notably those of the upper part of the main axis; branches of the panicle reflexed; spikelets mostly 1- or 2-flowered.
 - 10. *F. REFLEXA*.
 - 3b. Spikelets pubescent, the pubescence on glumes or lemmas or on both.
 - 4a. Pedicels appressed or slightly spreading; lower branches of panicle usually spreading or reflexed.
 - Lemmas glabrous; glumes pubescent..... 7. *F. CONFUSA*.
 - Lemmas pubescent.
 - Lemmas hirsute; glumes glabrous or pubescent; lower branches of panicle spreading or reflexed..... 8. *F. GRAYI*.
 - Lemmas woolly-pubescent; glumes glabrous; panicle nearly simple, the branches scarcely spreading..... 9. *F. ARIDA*.
 - 4b. Pedicels and panicle branches all finally spreading or reflexed.
 - Glumes glabrous; lemmas pubescent..... 11. *F. MICROSTACHYS*.
 - Glumes pubescent; lemmas pubescent..... 12. *F. EASTWOODAE*.
 - Glumes pubescent; lemmas glabrous..... 13. *F. TRACYI*.

Section 2. *Eufestuca*

- 1a. Blades flat, rather soft and lax, mostly more than 3 mm. wide.
 - Lemmas awned, the awn usually more than 2 mm. long.
 - Floret long-stipitate, the rachilla appearing to be jointed a short distance below the floret..... 14. *F. SUBULIFLORA*.
 - Floret not stipitate.
 - Lemmas indistinctly nerved; awn terminal; blades 3 to 10 mm. wide.
 - 15. *F. SUBULATA*.
 - Lemmas distinctly 5-nerved; awn from between 2 short teeth; blades 2 to 4 mm. wide.
 - 16. *F. ELMERI*.

Lemmas awnless or with an awn rarely as much as 2 mm. long.

Spikelets oblong to linear, mostly 8- to 10-flowered and more than 10 mm. long.

17. *F. ELATIOR.*

Spikelets ovate or oval, mostly not more than 5-flowered, less than 10 mm. long.

Lemmas acuminate, sometimes with an awn as much as 2 mm. long, membranaceous, distinctly nerved, 6 to 9 mm. long..... 18. *F. SORORIA.*

Lemmas awnless, obtuse to acutish, rather firm, indistinctly nerved.

Lemmas 5 to 7 mm. long, acutish..... 19. *F. VERSUTA.*

Lemmas about 4 mm. long, relatively blunt, rather turgid.

Spikelets loosely scattered in a very open panicle with long slender branches.

20. *F. OBTUSA.*

Spikelets somewhat aggregate toward the ends of rather short branches of a less open nodding panicle..... 21. *F. PARADOXA.*

1b. Blades involute or if flat less than 3 mm. wide (sometimes flat in *F. californica*, but firm and soon involute).

Ligule 2 to 4 mm. long or longer. Lemmas awnless or cuspidate.

Lemmas 7 mm. long..... 22. *F. THURBERI.*

Lemmas 4 mm. long..... 23. *F. LIGULATA.*

Ligule short.

Collar and mouth of sheath villous. Culms tall and stout (rather short in var. *parishii*).

25. *F. CALIFORNICA.*

Collar and mouth of sheath not villous.

Panicle branches densely ciliate on the angles. Blades about 1 mm. wide, flat or folded..... 26. *F. DASYCLADA.*

Panicle branches not ciliate on the angles.

Culms decumbent at the usually red, fibrillose base, in loose tufts. Awn of lemma shorter than the body; blades smooth..... 28. *F. RUBRA.*

Culms erect.

Lemmas 7 to 10 mm. long, scabrous. Culms densely tufted, rather stout, usually scabrous below the panicle; lemmas acute, rarely short-awned.

24. *F. SCABRELLA.*

Lemmas mostly not more than 7 mm. long.

Lemmas awnless (see also *F. arizonica*).

Lemmas 6 to 7 mm. long; culms slender, loosely tufted.

27. *F. VIRIDULA.*

Lemmas about 3 mm. long..... 31. *F. CAPILLATA.*

Lemmas awned.

Awn as long as or longer than body of the lemma; blades soft, glabrous, sulcate..... 29. *F. OCCIDENTALIS.*

Awn shorter than body of the lemma; blades slender, numerous, usually scabrous.

Blades mostly not more than half as long as the culms; panicle narrow, often almost spikelike, few-flowered, mostly less than 10 cm. long; culms mostly less than 30 cm. tall..... 30. *F. OVINA.*

Blades elongate; panicles 10 to 20 cm. long, somewhat open; culms 30 to 100 cm. tall.

Awn 2 to 4 mm. long..... 32. *F. IDAHOENSIS.*

Awn short or obsolete..... 33. *F. ARIZONICA.*

SECTION 1. *VŮLPĪA* (Gmel.) Reichenb.

Slender annuals; lemmas awned; stamens usually 1, sometimes 3; flowers usually self-pollinated, but young panicles are found with anthers and stigmas exerted. Some of the species, especially numbers 7 to 13, resemble each other closely. The differences, though small, appear to be constant, hence the recognizable forms are maintained as species, rather than reduced to varieties under leading species.

1. *Festuca octoflora* Walt. SIX-WEEKS FESCUE. (Fig. 43.) Culms erect, usually 15 to 30 cm. tall, sometimes as much as 60 cm.; blades narrow, involute, 2 to 10 cm. long; panicle narrow, the branches short, appressed or spreading; spikelets 6 to 8 mm. long, densely 5- to 13-flowered; glumes subulate-lanceolate, the first 1-nerved, the second 3-nerved, 3 to 4.5 mm. long; lemmas firm, convex, lanceolate, glabrous or scabrous, 4 to 5 mm. long, the mar-

gins not scarious; awn commonly 3 to 5, sometimes to 7 mm. long. ☉

—Open sterile ground, New York to Florida, Illinois, Kansas, and Texas; Idaho, Washington. The species and

its varieties are found throughout the United States.

FESTUCA OCTOFLORA var. *TENÉLLA* (Willd.) Fernald. Mostly smaller; panicle usually nearly simple; spike-

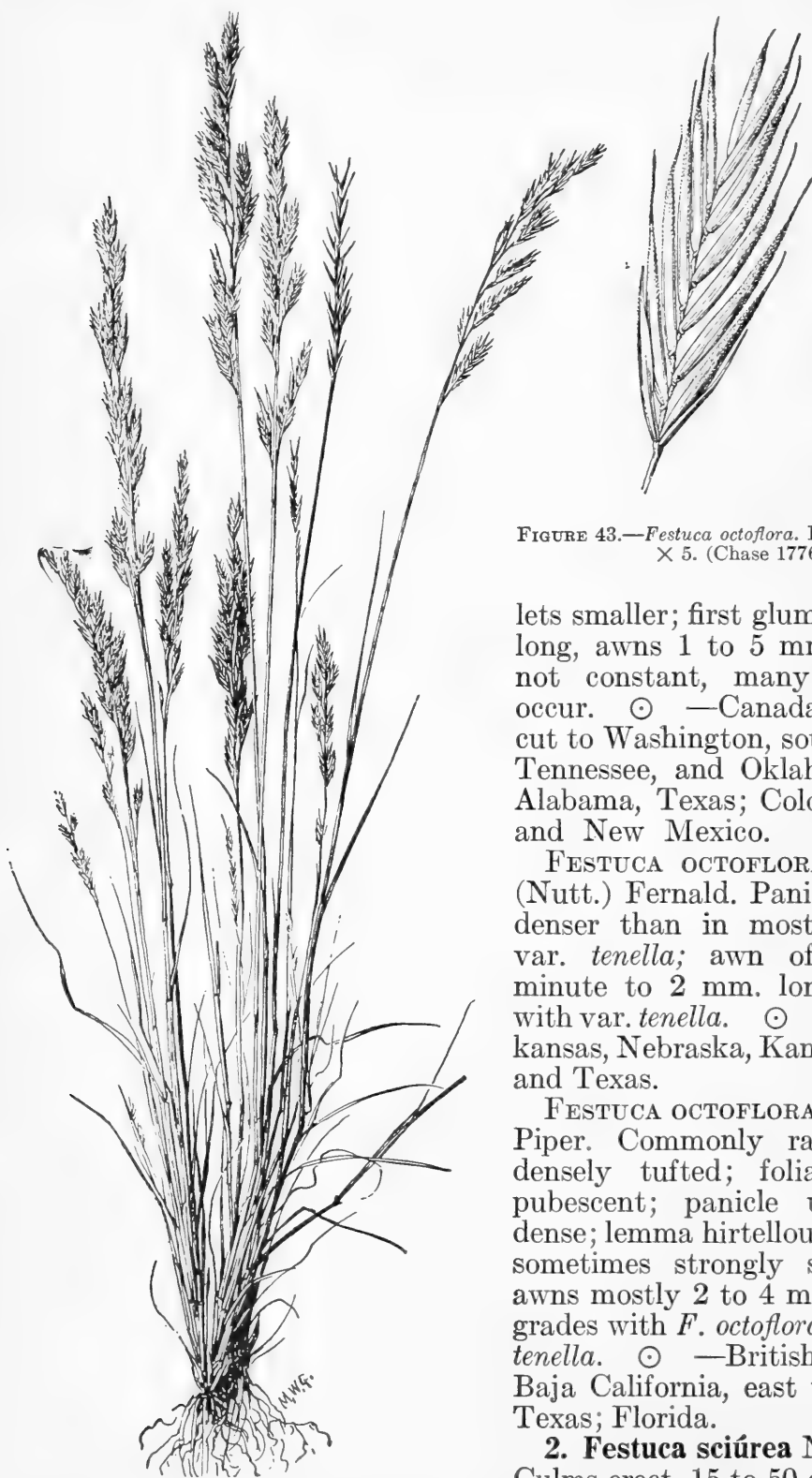


FIGURE 43.—*Festuca octoflora*. Plant, $\times \frac{1}{2}$; spikelet, $\times 5$. (Chase 1776, Ind.)

lets smaller; first glume 2.3 to 4 mm. long, awns 1 to 5 mm. Distinctions not constant, many intermediates occur. ☉ —Canada and Connecticut to Washington, south to Virginia, Tennessee, and Oklahoma; Georgia, Alabama, Texas; Colorado, Nevada, and New Mexico.

FESTUCA OCTOFLORA var. *GLAÚCA* (Nutt.) Fernald. Panicle shorter and denser than in most specimens of var. *tenella*; awn of lemma from minute to 2 mm. long. Intergrades with var. *tenella*. ☉ —Indiana, Arkansas, Nebraska, Kansas, Oklahoma, and Texas.

FESTUCA OCTOFLORA var. *HIRTÉLLA* Piper. Commonly rather low and densely tufted; foliage sometimes pubescent; panicle usually rather dense; lemma hirtellous or pubescent, sometimes strongly scabrous only; awns mostly 2 to 4 mm. long. Intergrades with *F. octoflora* and with var. *tenella*. ☉ —British Columbia to Baja California, east to Kansas and Texas; Florida.

2. *Festuca sciúrea* Nutt. (Fig. 44.)
Culms erect, 15 to 50 cm. tall; blades

less than 1 mm. wide, often capillary, soft, mostly involute, 1 to 10 cm. long; panicle narrow, 5 to 20 cm. long; spikelets 4- to 6-flowered, 4 to 5 mm. long; first glume 2 mm. long, the second 3.5 mm. long; lemmas 3 to 3.5 mm. long, sparsely appressed-pubescent; awn 6 to 11 mm. long.

⊙ —Open ground, New Jersey and Maryland to Florida, west to Oklahoma and Texas.

sterile ground, British Columbia to Baja California, common in the Coast Ranges of California, east to Montana and Arizona; introduced in a few localities eastward; Guatemala; Pacific slope of South America. In mature lemmas the cilia may be obscured by the inrolling of the edges; moistening the floret will bring the cilia to view.



FIGURE 44.—*Festuca sciurea*. Panicle, $\times \frac{1}{2}$; spikelet, $\times 5$. (Reverchon, Tex.)

3. *Festuca megalúra* Nutt. FOX-TAIL FESCUE. (Fig. 45.) Culms 20 to 60 cm. tall; sheaths and narrow blades glabrous; panicle narrow, 7 to 20 cm. long, the branches appressed; spikelets 4- or 5-flowered; first glume 1.5 to 2 mm. long, the second 4 to 5 mm. long; lemmas linear-lanceolate, scabrous on the back especially toward the apex, ciliate on the upper half; awn 8 to 10 mm. long. ⊙ —Open



FIGURE 45.—*Festuca megalúra*. Panicle, $\times 1$; spikelet, $\times 5$. (Leiberg 150, Oreg.)

4. *Festuca dertonensis* (All.) Aschers. and Graebn. (Fig. 46.) Resembling *F. megalura*, the panicles on the average shorter, usually less dense; glumes longer, the first about 4 mm.

long, the second 6 to 7 mm. long; lemma lanceolate, scabrous on the back toward the apex, 7 to 8 mm. long; awn 10 to 13 mm. long. ☉ — Dry hills and meadows, British Co-



FIGURE 46.—*Festuca dertonensis*. Plant, $\times \frac{1}{2}$; spikelet, $\times 5$. (Palmer 2041, Calif.)

lumbia to southern California, Arizona, and Texas; rare as a waif in the Eastern States; introduced from Europe. This species has been referred to *F. bromoides* L. by American authors.



FIGURE 47.—*Festuca myuros*. Spikelet, $\times 5$. (Chase 2393, D. C.)

5. *Festuca myuros* L. (Fig. 47.) Differing from *F. megalura* chiefly in the absence of cilia on the lemma; panicle usually smaller, first glume 1 to 1.5 mm., the second 4 to 4.5 mm. long. ☉ —Open ground, Coastal Plain, Massachusetts to Texas; Ohio; Wisconsin; Pacific coast, Washington to southern California; Arizona; Mexico and South America; introduced from Europe.

6. *Festuca pacifica* Piper. (Fig. 48.) Culms erect or geniculate at base, 30 to 60 cm. tall; blades soft, loosely involute, glabrous, 3 to 5 cm. long; panicle 5 to 12 cm. long, the lower branches solitary, somewhat distant, subsecund, spreading, 1 to 3 cm. long; spikelets 3- to 6-flowered; first glume subulate-lanceolate, about 4 mm. long, the second lanceolate-acumi-

nate, about 5 mm. long; lemmas lanceolate, glabrous or scaberulous, 6 to 7 mm. long; awn 10 to 15 mm. long. ☉ —Open ground, mountain slopes, and open woods, British Columbia to



FIGURE 48.—*Festuca pacifica*. Panicle, $\times 1$; floret, $\times 10$. (Type.)

Baja California, east to western Montana and New Mexico.

FESTUCA PACIFICA var. **SÍMULANS** Hoover. All spikelets reflexed or divergent at maturity. ☉ —Kern and Kings Counties, Calif.

7. *Festuca confusa* Piper. (Fig. 49.) Resembling *F. pacifica*; sheaths retrorsely pilose; foliage pubescent; spikelets usually 2- or 3-flowered; glumes hirsute with long spreading hairs; lemmas glabrous. ☉ —Dry hillsides, Washington to southern California.

8. *Festuca grayi* (Abrams) Piper. (Fig. 50.) Resembling *F. pacifica*, often somewhat stouter; sheaths and sometimes blades pubescent; glumes glabrous to sparsely villous; lemmas pubescent, puberulent or sometimes villous. ☉ (*F. microstachys* var. *grayi* Abrams.)—Open ground and rocky slopes, Washington to southern California and Arizona.

9. *Festuca árida* Elmer. (Fig. 51.) Culms erect or spreading, mostly less than 15 cm. tall; sheaths and blades



FIGURE 49.—*Festuca confusa*. Plant, $\times 1$; spikelet, $\times 5$. (Type.)

FIGURE 50.—*Festuca grayi*. Plant, $\times \frac{1}{2}$; spikelet, $\times 5$. (Pringle, Ariz.)

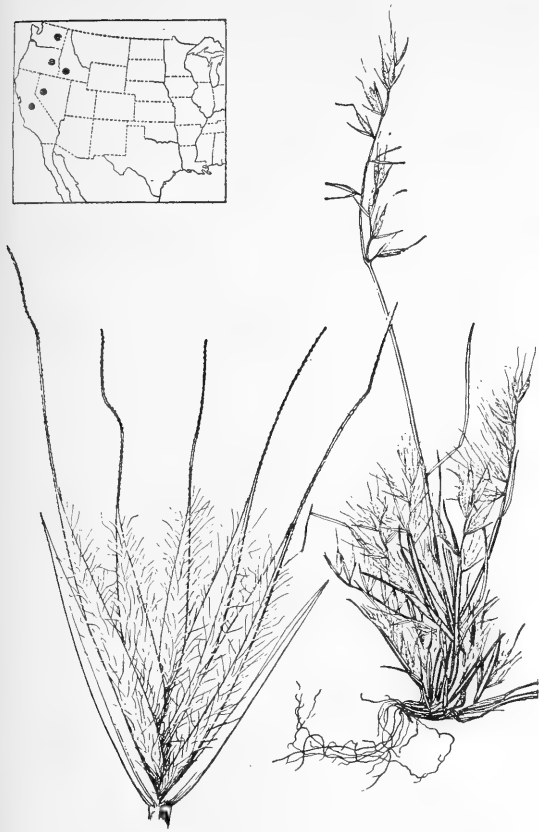
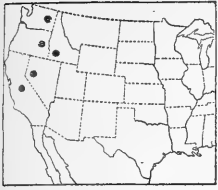


FIGURE 51.—*Festuca arida*. Plant, $\times \frac{1}{2}$; spikelet, $\times 5$. (Type.)

glabrous, the blades loosely involute, mostly less than 4 cm. long; panicle narrow, 2 to 5 cm. long, the branches appressed or the lowermost somewhat spreading; glumes about equal, glabrous, 5 to 6 mm. long; lemmas densely woolly, about 5 mm. long; awn 5 to 10 mm. long. ☉ —Sandy or dry ground, rare, eastern Washington and Oregon, southwestern Idaho, northeastern California, and western Nevada.

10. *Festuca refléxa* Buckl. (Fig. 52.) Culms 20 to 40 cm. tall; sheaths glabrous or pubescent; blades narrow, flat to subinvolute, 2 to 10 cm. long; panicle 5 to 12 cm. long, the solitary branches and the spikelets all at length divaricate; spikelets mostly 1- to 3-flowered, 5 to 7 mm. long; first glume 2 to 4 mm. long, the second 4 to 5 mm. long; lemmas glabrous or scaberulous, 5 to 6 mm. long; awn usually 5 to 8 mm. long. ☉ —Mesas, rocky slopes, and wooded

hills, Washington to southern California, east to Arizona and Utah.

11. *Festuca micrôstachys* Nutt. (Fig. 53.) Resembling *F. refléxa*; glumes glabrous; lemmas pubescent. ☉ —Open ground, Washington to California; rare.

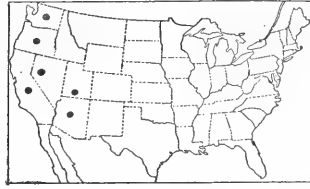


FIGURE 52.—*Festuca refléxa*. Panicle, $\times \frac{1}{2}$; spikelet, $\times 5$. (Brandegge 71, Calif.)

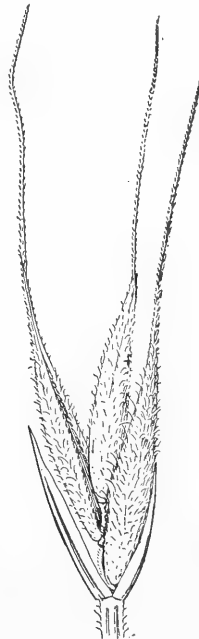


FIGURE 53.—*Festuca micrôstachys*. Spikelet, $\times 5$. (Allen, Calif.)

12. *Festuca eastwoodae* Piper. (Fig. 54.) Resembling *F. reflexa*; glumes hirsute; lemmas hirsute, the awn 4 to 5 mm. long. ☉ —Open ground, Oregon, Arizona, and California; rare.



FIGURE 54. — *Festuca eastwoodae*. Panicle, $\times \frac{1}{2}$; glumes, $\times 5$. (Type.)

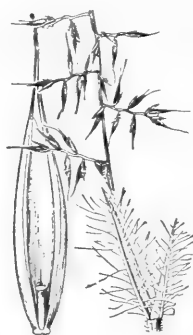


FIGURE 55. — *Festuca tracyi*. Panicle, $\times \frac{1}{2}$; glumes, $\times 5$; floret, $\times 5$. (Type.)

13. *Festuca tracyi* Hitchc. (Fig. 55.) Resembling *F. reflexa*; glumes rather sparsely hispid-villous, the first 1.5 to 2 mm. long, acute, the second 3 to 4 mm. long, obtusish or abruptly acute; lemmas glabrous, about 4 mm. long; awn 4 to 7 mm. long. ☉ —Open rocky ground, Washington (Bingen) and California (Kings and Napa Counties).

SECTION 2. EUFESTUCA Griseb.

Perennials, culms simple, stamens 3.

14. *Festuca subuliflora* Scribn. (Fig. 56.) Culms erect, slender, 60 to 100 cm. tall; blades flat (or loosely involute in drying), lax, pubescent on the upper surface, those of the culm mostly 2 to 4 mm. wide, those of the innovations narrower; panicle loose, lax, 10 to 20 cm. long, nodding, the branches drooping, the lower naked at base; spikelets loosely 3- to 5-flowered, the rachilla pubescent or hispid, the internodes of the rachilla as much as 2 mm. long; floret long-stipitate, the rachilla appearing to be jointed a short distance below the floret; glumes very narrow, acuminate, the first 3 to 4 mm., the second 4 to 5 mm., long; lemmas scaberulous toward the apex, 6 to 8 mm. long; awn somewhat flexuous, 10 to 15 mm. long. ☿ —Moist

shady places from sea level to 1,000 m., British Columbia to northern California, mostly near the coast. Peculiar in the stipitate base of the lemma. Aspect of *F. subulata*.

15. *Festuca subulata* Trin. BEARDED FESCUE. (Fig. 57.) Culms erect, mostly 50 to 100 cm. tall; blades flat, thin, lax, 3 to 10 mm. wide; panicle loose, open, drooping, 15 to 40 cm. long, the branches mostly in twos or threes, naked below, finally spreading or reflexed, the lower as much as 15 cm. long; spikelets loosely 3- to 5-flowered; glumes narrow, acuminate, the first about 3 mm., the second about 5 mm., long; lemmas somewhat keeled, scaberulous



FIGURE 56. — *Festuca subuliflora*. Panicle, $\times \frac{1}{2}$; spikelet, $\times 5$. (Howell 19, Oreg.)

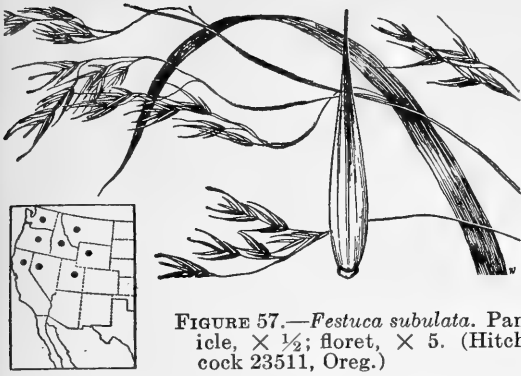


FIGURE 57.—*Festuca subulata*. Panicle, $\times \frac{1}{2}$; floret, $\times 5$. (Hitchcock 23511, Oreg.)

toward the apex, the intermediate nerves obscure, the tip attenuate into an awn 5 to 20 mm. long. 2 — Shady banks and moist thickets, up to 2,000 m., southeastern Alaska to Wyoming, Utah, and northern California.

16. *Festuca élmeri* Scribn. and Merr. (Fig. 58.) Culms loosely tufted, slender, 40 to 100 cm. tall, or even taller; blades flat, scabrous or pubes-



FIGURE 58.—*Festuca elmeri*. Panicle, $\times \frac{1}{2}$; spikelet, $\times 5$. (Type.)

cent on upper surface, 2 to 4 mm. wide, those of the innovations narrower, more or less involute; panicle loose, open, 10 to 20 cm. long, the branches slender, somewhat drooping, naked below, the lower as much as 10 cm. long; spikelets 3- or 4-flowered; glumes lanceolate-acuminate, the first 2 to 2.5 mm., the second 3 to 4 mm. long; lemmas membranaceous, hispidulous, about 6 mm. long, the nerves rather prominent, the apex minutely 2-toothed; awn 2 to 8 mm. long. 2 — Wooded hillsides, up to 500 m., mostly in the Coast Ranges, Oregon to central California. **FESTUCA ELMERI** var. **CONFERTA** (Hack.) Hitchc. More luxuriant; spikelets often 5- or 6-flowered and somewhat congested on the panicle branches. 2 (*F. jonesii* var. *conferta* Hack.) — Coast Ranges of California.

17. *Festuca elatior* L. MEADOW FESCUE. (Fig. 59.) Culms 50 to 120 cm. tall; blades flat, 4 to 8 mm. wide, scabrous above; panicle erect, or nodding at summit, 10 to 20 cm. long, contracted after flowering, much-branched or nearly simple, the branches spikelet-bearing nearly to base; spikelets usually 6- to 8-flowered, 8 to 12 mm. long; glumes 3 and 4 mm. long, lanceolate; lemmas oblong-lanceolate, coriaceous, 5 to 7 mm. long, the scarious apex acutish, rarely short-awned. 2 (*Festuca pratensis* Huds.) — Meadows, roadsides, and waste places; introduced throughout the cooler parts of North America; native of Eurasia. Cultivated for meadow and pasture. Sometimes called English bluegrass.

***Festuca gigantéa* (L.) Vill.** Blades broad, flat, thin; panicles open; lemmas long-awned, the awn flexuous and 2 or 3 times as long as the lemma. 2 — Dobbs Ferry, N. Y.; adventive from Europe.

***Festuca arundinácea* Schreb.** REED FESCUE, ALTA FESCUE. Culms somewhat taller and more robust than in *F. elatior*, and without rhizomes; blades longer; panicles 15 to 32 cm. long with more numerous branches

and spikelets, the spikelets broader, mostly looser, the lemmas 7 to 10 mm. long. 24 (*F. elatior* var. *arundinacea* (Schreb.) Wimm.)—Roadsides and meadows; introduced from Europe, sparingly spontaneous, Maine,

Massachusetts, New York, Ohio, Michigan, Utah, Washington to California. Recently rather widely cultivated in the Northern States, and also in Kentucky.



FIGURE 59.—*Festuca elatior*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Amer. Gr. Natl. Herb. 488, D. C.)

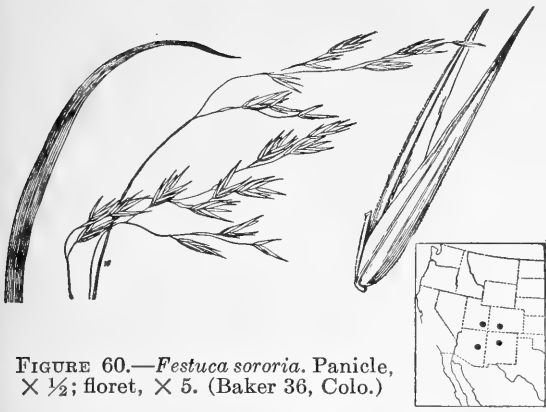


FIGURE 60.—*Festuca sororia*. Panicle, $\times \frac{1}{2}$; floret, $\times 5$. (Baker 36, Colo.)

18. *Festuca sororia* Piper. (Fig. 60.) Culms erect, loosely tufted, 60 to 90 cm. tall; blades flat, thin, smooth except the scabrous margins, 3 to 6 mm. wide; panicle loose, open, nodding, or sometimes somewhat condensed, 10 to 15 cm. long, the branches solitary or in twos, naked below; spikelets rather loosely 3- to 5-flowered; glumes lanceolate, the first about 3 mm., the second about 5 mm. long; lemmas membranaceous, somewhat keeled, scaberulous or nearly smooth, the nerves evident but not prominent, the apex tapering into a fine point or an awn as much as 2 mm. long. 2l —Open woods, 2,000 to 3,000 m., southern Colorado and Utah to New Mexico and Arizona.



FIGURE 61.—*Festuca versuta*. Panicle, $\times \frac{1}{2}$; spikelet, $\times 5$. (Johnson, Tex.)

19. *Festuca versuta* Beal. (Fig. 61.) Culms slender, 50 to 100 cm. tall; blades flat, mostly 2 to 5 mm. wide; panicle open, 10 to 15 cm. long, the spreading lower branches bearing a few spikelets above the middle; spikelets 2- to 5-flowered; glumes narrow, acuminate, nearly equal, 5 to 6 mm. long; lemmas firm, obscurely nerved at maturity, 5 to 7 mm. long, acute, awnless, rarely awn-tipped. 2l (*F. texana* Vasey; *F. johnsoni* Piper.)—Shady banks, Arkansas, Texas, and Oklahoma.



FIGURE 62.—*Festuca obtusa*. Panicle, $\times \frac{1}{2}$; floret, $\times 5$. (Amer. Gr. Natl. Herb. 490, Md.)

20. *Festuca obtusa* Bieler. NODDING FESCUE. (Fig. 62.) Culms solitary or few in a tuft, mostly 50 to 100 cm. tall; blades flat, lax, somewhat glossy, 4 to 7 mm. wide; panicle nodding, very loose and open, the branches spreading, spikelet-bearing toward the ends, the lower usually reflexed at maturity; spikelets 3- to 5-flowered; glumes about 3 and 4 mm. long; lemmas coriaceous, rather turgid, about 4 mm. long, obtuse or acutish, the nerves very obscure. 2l —Low or rocky woods, Quebec to Manitoba, south to northern Florida and eastern Texas.

21. *Festuca paradóxa* Desv. (Fig. 63.) Culms few to several in a tuft, 50 to 110 cm. tall, widely leaning; blades flat or subinvolute in drying, lax, 4 to 8 mm. wide; panicle 12 to 20 cm. long, heavily drooping, the slender scabrous branches not so long as in *F. obtusa*; the brownish spikelets somewhat aggregate toward the ends; spikelets 3- to 6-flowered, the lemmas

more blunt. 21 (*F. shortii* Kunth)
—Prairies, low open ground, and
thickets, Pennsylvania and Delaware
to South Carolina, Wisconsin, and
eastern Texas.



FIGURE 63.—*Festuca paradoxa*. Panicle, $\times \frac{1}{2}$; floret, $\times 5$. (Palmer 34672, Mo.)



FIGURE 64.—*Festuca thurberi*. Panicle, $\times \frac{1}{2}$; spikelet, $\times 5$. (Pammel, Colo.)

22. *Festuca thurberi* Vasey. THURBER FESCUE. (Fig. 64.) Culms densely tufted, rather stout, erect, 60 to 90 cm. tall; ligule 2 to 4 mm. long; blades involute, scabrous, firm, erect; panicle 10 to 15 cm. long, the branches usually solitary, somewhat remote, ascending or spreading, naked below; spikelets 3- to 6-flowered; glumes rather broad, about 4 and 5 mm. long; lemmas rather firm, faintly nerved, glabrous or nearly so, acute or cuspidate, 7 to 8 mm. long. 21

—Dry slopes and rocky hills, 2,500 to 3,500 m., Wyoming to New Mexico and Utah.

23. *Festuca ligulata* Swallen. (Fig. 65.) Culms slender, loosely tufted, erect from a decumbent often rhizomatous base, scabrous below the panicle; sheaths glabrous; blades 6 to 20 cm. long, those of the innovations as much as 30 cm. long, flat and 1 to 2 mm. wide or mostly involute, scabrous, rather firm; ligule 3 to 3.5 mm. long; panicle 6 to 10 cm. long, the 1 or 2 scabrous branches stiffly ascending or spreading, few-flowered; naked below; spikelets 6 mm. long, 2- to 3-flowered, the pedicels (mostly shorter than the spikelets) appressed; glumes acute or acutish, scabrous, the first 3 mm. long, 1-nerved, the second 4 mm. long, 3-nerved; lemmas 4 to 5 mm. long, acutish, scabrous, obscurely nerved, awnless, the paleas slightly longer. 21 —Moist shady slopes, Guadalupe and Chisos Mountains, Tex.



FIGURE 65.—*Festuca ligulata*. Plant, $\times \frac{1}{2}$; floret, $\times 5$. (Type.)

24. *Festuca scabrella* Torr. ROUGH FESCUE. (Fig. 66.) Culms densely tufted (rarely producing a slender rhizome), erect, 30 to 90 cm. tall; ligule very short; blades firm, erect, scabrous, involute, or those of the culm sometimes flat but narrow; panicle narrow, 5 to 15 cm. long, the branches solitary or in pairs, the lowermost sometimes in threes, appressed or ascending, naked below;

spikelets 4- to 6-flowered; glumes somewhat unequal, lanceolate, 7 to 9 mm. long; lemmas firm, rather strongly nerved, scaberulous, acute to cuspidate or short-awned, 7 to 10 mm. long. 2 (*F. hallii* Piper; *F. kingii* var. *rabiosa* (Piper) Hitchc.; *Hesperochloa kingii* var. *rabiosa* (Piper) Swallen.)—Prairies, hillsides, and open woods, up to about 2,000 m. (probably alpine in Colorado), Newfoundland to British Columbia, south to Oregon, North Dakota, and Colorado. **FESTUCA SCABRELLA** var. **MÁJOR** Vasey. Culms on the average taller; panicle larger and more spreading; lemmas more strongly nerved. 2 (*F. campestris* Rydb.)—Hills and dry woods, Michigan (Roscommon), Montana to Washington.

25. Festuca californica Vasey. CALIFORNIA FESCUE. (Fig. 67.) Culms tufted, rather stout, 60 to 120 cm. tall; sheaths somewhat scabrous, the collar pubescent or pilose; blades firm, usually involute, sometimes flat, scabrous; panicle open, 10 to 30 cm. long, the rather remote branches usually in pairs, spreading or drooping, naked below; spikelets mostly 4- or 5-flowered; glumes somewhat unequal, 5 to 8 mm. long; lemmas firm, faintly nerved, scaberulous, acuminate or short-awned. 2 (*F. aristulata* Shear.)—Open dry ground, thickets and open woods, up to about 1,500 m., Oregon and California, west of the Sierra Nevada. A smaller form with pubescent lower sheaths, and shorter, mostly glabrous blades, has been segregated as *F. californica* var. *parishii* (Piper) Hitchc.—Oregon and California (San Bernardino Mountains).

26. Festuca dasyclada Hack. ex Beal. (Fig. 68.) Culms 20 to 40 cm. tall; blades folded, about 2 mm. wide when spread, those of the culm 4 to 6 cm. long, those of the innovations 10 to 15 cm. long; panicle open, 7 to 12 cm. long, the branches rather stiffly and divaricately spreading, softly pubescent; angles ciliate; spikelets pale, long-pedicel, 2-flowered; glumes lanceolate, acuminate, the first about 4 mm., the second about 6 mm. long; lemmas rather thin,



FIGURE 66.—*Festuca scabrella*. Panicle, $\times \frac{1}{2}$; floret $\times 5$. (Rydborg 2106, Mont.)



FIGURE 67.—*Festuca californica*. Panicle, $\times \frac{1}{2}$; floret, $\times 5$. (Elmer 4431, Calif.)

somewhat keeled, rather strongly nerved, scaberulous, about 6 mm. long; awn about 2 mm. long, from between 2 minute teeth. ♀ — Rocky slopes, rare, Utah.

FESTUCA RIGÉSCENS (Presl) Kunth. Densely tufted, about 30 cm. tall; blades firm, involute, sharp-pointed; panicle narrow, few-flowered, 5 to 10 cm. long; spikelets about 3-flowered, 6 to 7 mm. long; lemmas ovate, thick, convex, awnless or mucronate, 4 to 4.5 mm. long. ♀ — There is a single specimen of this species in the United States National Herbarium, labeled "Arizona, Tracy?" On the sheet is a note made by Professor Piper (Feb. 12, 1904) quoting Tracy, "In open pine woods 4 miles south-east of Flagstaff, about June 20, 1887." This agrees exactly with specimens of this species from Peru, whence originally described. Since the species is not known north of Peru, except from this specimen, it seems probable that the label has been misplaced.



FIGURE 68.—*Festuca dasyclada*. Panicle, $\times \frac{1}{2}$; glumes and floret, $\times 5$. (Dupl. type.)

27. *Festuca viridula* Vasey. GREEN-LEAF FESCUE. (Fig. 69.) Culms rather loosely tufted, erect, 50 to 100 cm. tall; blades soft, erect, those of the culm flat or loosely involute, those of the innovations slender, involute; panicle open, 10 to 15 cm. long, the branches mostly in pairs, ascending or spreading, slender, somewhat remote, naked below; spikelets 3- to 6-flowered; glumes lanceolate, somewhat unequal, 5 to 7 mm. long; lemmas membranaceous, acute or cuspidate, glabrous, 6 to 8 mm. long. ♀ — Mountain meadows and open

slopes, 1,000 to 2,000 m., British Columbia to Alberta, south to central California and Idaho; Colorado (Willow Pass). An important forage grass in the mountains of the Northwestern States. *Festuca howellii* Hack. ex Beal, differing from *F. viridula* in having more scabrous lemmas and awns 2 mm. long, does not seem sufficiently distinct to be recognized as a species. ♀ — Known from a single collection (Josephine County, Oreg.).



FIGURE 69.—*Festuca viridula*. Panicle, $\times \frac{1}{2}$; floret, $\times 5$. (Cusick 2431, Oreg.)

28. *Festuca rubra* L. RED FESCUE. (Fig. 70.) Culms usually loosely tufted, bent or decumbent at the reddish or purplish base, occasionally closely tufted, erect to ascending, 40 to 100 cm. tall; lower sheaths brown, thin, and fibrillose; blades smooth, soft, usually folded or involute; panicle 3 to 20 cm. long, usually contracted and narrow, the branches mostly erect or ascending; spikelets 4- to 6-flowered, pale green or glaucous, often purple-tinged; lemmas 5 to 7 mm. long, smooth, or scabrous toward apex, bearing an awn about half as long. ♀ — Meadows, hills, bogs, and marshes, in the cooler parts of the northern hemisphere, extending south in the Coast Ranges to Monterey, in the Sierra Nevada to the San Bernardino Mountains, in the Rocky Mountains to Colorado

and New Mexico, San Francisco and the Allegheny Mountains and in the Atlantic coastal marshes to Georgia; Mexico,



FIGURE 70.—*Festuca rubra*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Hitchcock 4201, Alaska.)

Eurasia, North Africa. Occasionally used in grass mixtures for pastures in the Northern States. *FESTUCA RUBRA* var. *LANUGINÓSA* Mert. and Koch. Lemmas pubescent. 2 — Oregon to Wyoming and northward; Michigan, Vermont to Connecticut; Europe. A proliferous form (*F. rubra* var. *prolifera* Piper, *F. prolifera* Fernald) is found in the White Mountains of New Hampshire, in Maine and northward. *FESTUCA RUBRA* var. *COMMUTÁTA* Gaud. (*F. fallax* Thuill.). **CHEWINGS FESCUE.** A form with more erect culms, producing a firmer sod, commonly cultivated in New Zealand and occasionally in the United States. 2 — *FESTUCA RUBRA* var. *HETEROPHÝLLA* (Lam.) Mut. **SHADE FESCUE.** Densely tufted; basal blades filiform; culm blade flat. 2 — Used for lawns in shady places. Europe.

29. *Festuca occidentális* Hook.
WESTERN FESCUE. (Fig. 71.) Culms



FIGURE 71.—*Festuca occidentális*. Panicle, $\times \frac{1}{2}$; spikelet, $\times 5$. (Piper 4908, Wash.)

tufted, erect, slender, 40 to 100 cm. tall; blades mostly basal, slender, involute, sulcate, soft, smooth or nearly so; panicle loose, 7 to 20 cm. long, often drooping above, the branches solitary or in pairs; spikelets loosely 3- to 5-flowered, 6 to 10 mm. long, mostly on slender pedicels; lemmas rather thin, 5 to 6 mm. long, scaberrulous toward the apex, attenuate into a slender awn about as long or longer. 2 — Dry rocky wooded slopes and banks, British Columbia to central California, east to Wyoming, northern Michigan, and western Ontario.



FIGURE 72.—*Festuca ovina*. Panicle, $\times \frac{1}{2}$; floret, $\times 5$. (Robbins 8692, Colo.)

30. *Festuca ovína* L. SHEEP FESCUE. (Fig. 72.) Culms densely tufted, usually 20 to 40 cm. tall; blades slender, involute, from very scabrous to glabrous, the innovations numerous in a basal cluster, 5 to 10 cm. long or sometimes longer; panicle narrow, sometimes almost spikelike, 5 to 8 cm. long, sometimes longer; spikelets mostly 4- or 5-flowered; lemmas about 4 to 5 mm. long, short-awned. 2 (*F. saximontana* Rydb.; *F. calligera* Rydb.; *F. minutiflora* Rydb., a rare form with small florets; *F. ovina* var. *pseudovina* Hack. of Piper's revision of *Festuca*.)—Open woods and stony slopes, North Dakota to Washington and Alaska, south to Arizona and New Mexico; introduced eastward through Michigan, Maine, Illinois, and South Carolina; Eurasia. *Festuca ovina*, *F. ovina* var. *duriuscula*, and *F. capillata* are occasionally cultivated in lawn mixtures.

FESTUCA OVINA var. **DURIÚSCULA** (L.) Koch. **HARD FESCUE**. Blades smooth, wider and firmer than in *F. ovina*. 2 —Maine to Iowa and Virginia; introduced from Europe.

FESTUCA OVINA var. **BRACHYPHYLLA** (Schult.) Piper. **ALPINE FESCUE**. An alpine and high northern form differing in the lower culms, mostly 5 to 20 cm. tall, and the smooth short rather lax blades. 2 (*F. brachyphylla* Schult.; *F. ovina* var. *supina* Hack. of Piper's revision of *Festuca*.)—Rocky slopes, at high altitudes, mostly above timber line in the United States, arctic regions south to San Bernardino Mountains, San Francisco Mountains, California, and, in the Rocky Mountains, to northern New Mexico; also in the high mountains of Vermont, New Hampshire, and New York.

FESTUCA OVINA var. **GLAÚCA** (Lam.) Koch. **BLUE FESCUE**. Blades elongate, glaucous. 2 (*F. glauca* Lam.)—Cultivated as a border plant.

31. Festuca capillata Lam. **HAIR FESCUE**. (Fig. 73.) Densely tufted,

FIGURE 73.—*Festuca capillata*. Plant, $\times \frac{1}{4}$; floret, $\times 5$. (Hitchcock 23624, Newf.)



more slender and lower than *F. ovina*; blades capillary, flexuous, usually more than half as long as the culm; spikelets smaller; lemmas about 3 mm. long, awnless. 2 —Lawns and waste places, Newfoundland and Maine to North Carolina and Illinois; Minnesota; Oregon; introduced from Europe.

32. Festuca idahoensis Elmer. **IDAHO FESCUE**. (Fig. 74.) Culms usually densely tufted in large



FIGURE 74.—*Festuca idahoensis*. Plant, $\times \frac{1}{2}$; floret, $\times 5$. (Heller 3318, Idaho.)

bunches, 30 to 100 cm. tall; blades numerous, usually elongate, very scabrous, rarely smooth, filiform, involute; panicle narrow, 10 to 20 cm. long, the branches ascending or appressed, somewhat spreading in anthesis; spikelets mostly 5- to 7-flowered; lemmas nearly terete, about 7 mm. long; awn usually 2 to 4 mm. long. 2 (*F. ovina* var. *ingrata* Beal.)—Open woods and rocky slopes, British Columbia to Alberta, south to central California and Colorado.

33. Festuca arizonica Vasey. **ARIZONA FESCUE**. (Fig. 75.) Resembling *F. idahoensis*; differing in the stiffer glaucous foliage, somewhat smaller awnless or nearly awnless lemmas. 2 —Open pine woods, Nevada and Colorado to Texas and Arizona. Often called pinegrass.



FIGURE 75.—*Festuca arizonica*. Panicle, $\times \frac{1}{2}$; floret, $\times 5$. (Leiberg 5685, Ariz.)

FESTUCA AMETHYSTINA L. Slender tufted perennial; blades filiform, 15 to 25 cm. long; panicle 5 to 10 cm. long, rather narrow; spikelets about as in *F. ovina*, often purplish. ♀ —Sometimes cultivated for ornament. Europe.

FESTUCA GENICULATA (L.) Cav. Annual; culms slender, geniculate below, 20 to 50 cm. tall; panicle 3 to 6 cm. long, rather compact; spikelets awned. ☉ —Sometimes cultivated for ornament. Portugal.

FESTUCA VALESIIACA Schleich. ex Gaud. Slender densely tufted perennial, 15 to 30 cm. tall; blades very slender, sulcate, scabrous, those of the innovations numerous, 10 to 18 cm. long; panicle 4 to 8 cm. long, narrow, the short branches ascending; spikelets similar to those of *F. ovina*, to which this species is closely related. ♀ —Sometimes cultivated in grass gardens. Europe.

5. *SCLERÓPOA* Griseb.

Spikelets several-flowered, linear, somewhat compressed, the thick rachilla disarticulating above the glumes and between the florets, remaining as a minute stipe to the floret above; glumes unequal, short, acut-

ish, strongly nerved, the first 1-nerved, the second 3-nerved; lemmas nearly terete, obscurely 5-nerved, obtuse, slightly scarious at the tip. Annuals with slightly branched 1-sided panicles. Type species, *Scleropoa rigida*. Name from Greek *skleros*, hard, and *poa*, grass, alluding to the stiff panicle.

1. *Scleropoa rigida* (L.) Griseb. (Fig. 76.) Culms erect or spreading, 10 to 20 cm. tall; blades flat, 1 to 2 mm. wide; panicles narrow, stiff, condensed, 5 to 10 cm. long, the branches short, floriferous to base, these and the thick pedicels somewhat divaricately spreading in anthesis; spikelets 4- to 10-flowered, 5 to 8 mm. long; glumes about 2 mm. long; lemmas about 2.5 mm. long. ☉ —Waste places and fields, sparingly introduced from Europe, Massachusetts; Florida to Mississippi; Texas; South Dakota; Washington to California.



FIGURE 76.—*Scleropoa rigida*. Plant, $\times 1$; two views of floret, $\times 10$. (Cocks, Miss.)

6. PUCCINÉLLIA Parl. ALKALI-GRASS

Spikelets several-flowered, usually terete or subterete, the rachilla disarticulating above the glumes and between the florets; glumes unequal, shorter than the first lemma, obtuse or acute, rather firm, often scarious at tip, the first 1-nerved or sometimes 3-nerved, the second 3-nerved; lemmas usually firm, rounded on the back, obtuse or acute, rarely acuminate, usually scarious and often erose at the tip, glabrous or puberulent toward base, rarely pubescent on the nerves, 5-nerved, the nerves parallel, indistinct, rarely rather prominent; palea about as long as the lemma or somewhat shorter. Low pale smooth tufted annuals or perennials with narrow to open panicles. Type species, *Puccinellia distans*. Named for Prof. Benedetto Puccinelli.

The species of the interior are grazed by stock. One, *P. airoides*, furnishes considerable forage in the regions where it is common. A form of this, called Zawadke alkali-grass, is cultivated in Montana.

Lemmas obtuse, pubescent on the nerves for half or three-fourths their length. Dwarf annual..... 1. *P. PARISHII*.

Lemmas glabrous or, if pubescent, the hairs not confined to the nerves.

Panicles narrow, strict, the branches appressed, mostly with one spikelet; annual, mostly less than 20 cm. tall; lemmas acute, more or less pubescent..... 2. *P. SIMPLEX*.

Panicles narrow or open, not strict; annual or perennial; lemmas glabrous or pubescent only at base.

Panicles ellipsoid, rather compact, less than 10 cm. long, the branches floriferous nearly to base. Lemmas rather coriaceous; culms rather stout.

Spikelets 5 to 8 mm. long; lemmas 3 to 3.5 mm. long..... 3. *P. RUPESTRIS*.

Spikelets 3 to 4 mm. long; lemmas 2 to 2.5 mm. long..... 4. *P. FASCICULATA*.

Panicles pyramidal or elongate, some of the branches naked below, or reduced, narrow, and few-flowered.

Leaves mostly in a short basal tuft, the blades involute, 5 to 10 cm. long. Panicle 5 to 10 cm. long, open and spreading; lemmas 3.5 mm. long, glabrous, acute.

5. *P. LEMMONI*.

Leaves distributed, not in a basal tuft.

Anthers about 2 mm. long; lemmas 4 to 5 mm. long, pubescent at base.

6. *P. MARITIMA*.

Anthers 1 mm. long or less.

Lemmas about 2 mm. long (2 to 3 mm. in *P. airoides*); panicle open; the slender branches spreading or reflexed.

Lemmas broad, obtuse or truncate, not narrowed above; lower panicle branches usually reflexed..... 7. *P. DISTANS*.

Lemmas narrow, narrowed into an obtuse apex; panicle branches spreading, usually not reflexed..... 8. *P. AIROIDES*.

Lemmas 3 to 4 mm. long; panicle narrow, the branches ascending or finally spreading.

Plants lax, usually 10 to 30 cm. tall; panicle 5 to 10 cm. long, the branches finally spreading, glabrous..... 9. *P. PUMILA*.

Plants usually 50 to 90 cm. tall; panicle 10 to 20 cm. long, the branches ascending or appressed, scabrous..... 10. *P. GRANDIS*.

1. *Puccinellia parishii* Hitchc.
(Fig. 77.) Annual; culms 3 to 10 cm. tall; blades flat to subinvolute, less than 1 mm. wide; panicle narrow, few-flowered, 1 to 4 cm. long; spikelets 3- to 6-flowered, 3 to 5 mm. long; lemmas about 2 mm. long, obtuse to truncate, scarious and somewhat erose at the tip, pubescent on the mid and lateral nerves nearly to the apex, and on the intermediate nerves about half way. ☉ —Marshes, California

FIGURE 77.—*Puccinellia parishii*.
Panicle, $\times 1$; floret, $\times 10$. (Type.)



(Rabbit Springs, San Bernardino County) and Arizona (Tuba City).

2. *Puccinellia simplex* Scribn. (Fig. 78.) Annual; culms 7 to 20 cm. tall; blades narrow, soft, flat; panicle narrow, about half the length of the entire plant, the branches few, short, appressed, mostly with 1 spikelet; spikelets 6 to 8 mm. long, appressed; glumes strongly 3-nerved, 1 and 2 mm. long; lemmas 2.5 mm. long, tapering from below the middle to the acute apex, more or less pubescent over the back. ☉ —Alkaline soil, California; common in alkaline areas of the San Joaquin Valley.



FIGURE 78.—*Puccinellia simplex*. Plant, $\times 1$; floret $\times 10$. (Type.)

3. *Puccinellia rupestris* (With.) Fern. and Weath. (Fig. 79.) Annual; culms rather stout, mostly 10 to 20 cm. tall; blades flat, 2 to 6 mm. wide; panicle ellipsoid, glaucous, rather dense, mostly 3 to 6 cm. long, the branches mostly not more than 1.5



FIGURE 79.—*Puccinellia rupestris*. Panicle, $\times 1$; floret, $\times 10$. (Martindale, N. J.)

cm. long, stiffly ascending, floriferous nearly to base; spikelets 3- to 5-flowered, 5 to 8 mm. long, sessile or nearly so; glumes 3- to 5-nerved, 1.5 and 2.5 mm. long; lemmas 3 to 3.5 mm. long, firm, obscurely nerved, glabrous, obtuse, the apex entire or nearly so. ☉ —Ballast near New York and Philadelphia. Europe.



FIGURE 80.—*Puccinellia fasciculata*. Panicle, $\times 1$; floret, $\times 10$. (Stebbins, Maine.)

4. *Puccinellia fasciculata* (Torr.)

Bicknell. (Fig. 80.) Apparently perennial; culms rather stout, 20 to 50 cm. tall, sometimes taller; blades flat, folded, or subinvolute, 2 to 4 mm. wide; panicle ellipsoid, 5 to 15 cm. long, the branches fascicled, rather stiffly ascending, some naked at base but with short basal branchlets, all rather densely flowered; spikelets 2- to 5-flowered, 3 to 4 mm. long; glumes ovate, 1 and 1.5 mm. long; lemmas 2 to 2.5 mm. long, firm, obtuse. 2 (*P. borrieri* Hitchc.)—Salt marshes along the coast, Nova Scotia to Virginia; Utah, Nevada and Arizona; Europe.

5. *Puccinellia lemmóni* (Vasey)

Scribn. (Fig. 81.) Perennial; culms erect, slender, 15 to 30 cm. tall; leaves mostly in an erect basal tuft, the slender blades involute, 5 to 10 cm. long; panicle pyramidal, open, 5 to 10 cm. long, the slender flexuous branches fascicled, the lower spread-



FIGURE 82.—*Puccinellia maritima*. Plant, $\times 1$; floret, $\times 10$. (Fernald and Long 20051, Nova Scotia.)



FIGURE 81.—*Puccinellia lemmonii*. Panicle, $\times 1$; floret, $\times 10$. (Jones 4115, Nev.)

ing, the longer ones naked on the lower half; spikelets narrow, 3- to 5-flowered, the rachilla often exposed; glumes about 1 and 2 mm. long; lemmas narrow, acute, glabrous, about 3.5 mm. long; anthers 1.5 mm. long. 2 —Moist alkaline soil, southern Idaho and Washington to Nevada and California.

6. *Puccinellia maritima* (Huds.)

Parl. (Fig. 82.) Perennial; culms erect, rather coarse, 20 to 40 cm. tall, sometimes taller; blades 1 to 2 mm. wide, usually becoming involute; panicle mostly 10 to 20 cm. long, the branches ascending or appressed, or spreading in anthesis; spikelets 4- to 10-flowered; glumes 3-nerved, 2 to 3 and 3 to 4 mm. long; lemmas 4 to 5 mm. long, pubescent on the base of the lateral

nerves and sometimes sparingly between the nerves; anthers 1.5 to 2 mm. long. 21 —Salt marshes and brackish shores, Nova Scotia to Rhode Island; Washington; on ballast, Philadelphia and Camden; Europe.

7. *Puccinellia distans* (L.) Parl. (Fig. 83.) Perennial; culms erect or decumbent at base, 20 to 40 cm. tall, sometimes taller; blades flat or more or less involute, mostly 2 to 4 mm. wide; panicle pyramidal, loose, 5 to 15 cm. long, the branches fascicled, rather distant, the lower spreading or finally reflexed, the longer ones naked half their length or more; spikelets 4- to 6-flowered, 4 to 5 mm. long; glumes 1 and 2 mm. long; lemmas rather thin, obtuse or truncate, 1.5 or usually about 2 mm. long, with a few short

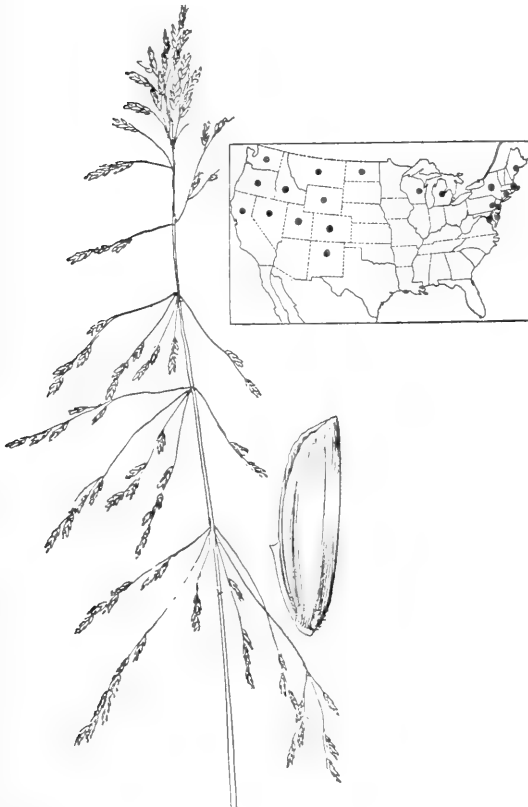


FIGURE 83.—*Puccinellia distans*. Panicle, $\times \frac{1}{2}$; floret, $\times 10$. (Schuette, Wis.)

hairs at base; anthers about 0.8 mm. long. 24 —Moist, more or less alkaline soil, Quebec to British Columbia, south to Maryland, Michi-

gan, Wisconsin, and North Dakota; Washington, south to New Mexico and California; introduced from Eurasia. The more slender specimens are



FIGURE 84.—*Puccinellia airoides*. Panicle, $\times 1$; floret, $\times 10$. (Rydborg 2135, Mont.)

the form described as *P. distans* var. *tenuis* (Uechtritz) Fern. and Weath.

8. *Puccinellia airoides* (Nutt.) Wats. and Coult. NUTTALL ALKALI-GRASS. (Fig. 84.) Perennial; culms usually erect, slender, rather stiff and firm at base, mostly 30 to 60 cm. rarely to 1 m. tall; blades 1 to 3 mm. wide, flat, or becoming involute; panicle pyramidal, open, mostly 10 to 20 cm. long, the distant scabrous branches fascicled, spreading, naked below, as much as 10 cm. long; spikelets 3- to 6-flowered, 4 to 7 mm. long, the florets rather distant, the rachilla often exposed; pedicels scabrous; glumes 1.5 to 2 mm. long; lemmas 2 to 3 mm. long, rather narrow, somewhat narrowed into an obtuse apex; anthers about 0.7 mm. long. 24 (*P. nuttalliana* Hitchc.) —Moist, usually alkaline soil, Wisconsin to British Columbia, south to Kansas, New Mexico, and California; introduced in Maine and Vermont. The form with lemmas 2.5 to 3 mm. long has been called *P. cusickii* Weatherby. Alberta to Wyoming and Oregon.

9. *Puccinellia pumila* (Vasey) Hitchc. (Fig. 85.) Perennial; culms lax, erect or ascending from a de-



FIGURE 85.—*Puccinellia pumila*. Plant, $\times 1$; floret, $\times 10$. (Type.)

cumbent base, 10 to 30 cm. tall; blades rather soft, mostly flat, 1 to 2 mm. wide; panicle pyramidal, open, mostly 5 to 10 cm. long, the lower branches naked below, usually finally spreading or even reflexed; spikelets 4- to 6-flowered; glumes 1.5 and 2.5 mm. long; lemmas 3 to 4 mm. long, rather broad, narrowed toward the obtuse nearly entire apex, obscurely pubescent near base or glabrous;

anthers 0.8 to 1 mm. long. 2 — Salt marshes and shores, Labrador to Connecticut; Alaska to Oregon.

10. *Puccinellia grândis* Swallen. (Fig. 86.) Culms densely tufted, 50 to 90 cm. tall; sheaths glabrous; ligule 2 to 3 mm. long; blades firm, drying involute, 2 to 3.5 mm. wide, panicles 10 to 20 cm. long, pyramidal, the scabrous branches finally spreading; spikelets 8 to 15 mm. long, 5- to 12-flowered, appressed; lemmas 3 to 4 mm. long, obtuse or subacute, sparsely pilose at the base; anthers 1.3 to 1.5 mm. long. 2 — Sea beaches, Alaska to central California. This species has been referred to *P. nutkaensis* (Presl) Fern. and Weath., a northern species, not known from the United States.



FIGURE 86.—*Puccinellia grândis*. Panicle, $\times 1$; floret, $\times 10$. (Macoun 66, Br. Col.)

7. GLYCÉRIA R. Br. MANNAGRASS

(*Panicularia* Heist.)

Spikelets few- to many-flowered, subterete or slightly compressed, the rachilla disarticulating above the glumes and between the florets; glumes un-

equal, short, obtuse or acute, usually scarious, mostly 1-nerved (the second 3-nerved in a few species); lemmas broad, convex on the back, firm, usually obtuse, scarious at the apex, 5- to 9-nerved, the nerves parallel, usually prominent. Usually tall aquatic or marsh perennials, with creeping and rooting bases or with creeping rhizomes, simple culms, mostly closed or partly closed sheaths, flat blades, and open or contracted panicles. Type species, *Glyceria fluitans*. Name from the Greek *glukeros*, sweet, the seed of the type species being sweet.

The species are all palatable grasses but are usually of limited distribution, and most of them are confined to marshes or wet land. *Glyceria elata*, tall mannagrass, is a valuable component of the forage in moist woods of the Northwestern States. *G. striata*, fowl mannagrass, widely distributed, *G. grandis*, American mannagrass, in the Northern States, and *G. pauciflora* of the Northwest are marsh species, but are often grazed.

Spikelets linear, nearly terete, usually 1 cm. long or more, appressed on short pedicels; panicles narrow, erect.....

SECTION 1. EUGLYCERIA.

Spikelets ovate or oblong, more or less compressed, usually not more than 5 mm. long; panicles usually nodding.....

SECTION 2. HYDROPOA.

Section 1. *Euglyceria*

Lemmas acute, much exceeded by the palea..... 1. *G. ACUTIFLORA*.

Lemmas obtuse; palea about as long as the lemma (or slightly longer in *G. septentrionalis* and *G. fluitans*).

Lemmas glabrous between the slightly scabrous nerves..... 2. *G. BOREALIS*.

Lemmas scaberulous or hirtellous between the usually distinctly scabrous nerves.

Lemmas about 3 mm. long, broadly rounded at the summit.

First glume 1.5 mm. long; lemmas scaberulous..... 3. *G. LEPTOSTACHYA*.

First glume 2 to 2.5 mm. long; lemmas hirtellous..... 4. *G. ARKANSANA*.

Lemmas 4 to 7 mm. long.

Culms more than 60 cm., commonly more than 1 m. tall, flaccid; sheaths closed from below the summit, blades elongate, mostly more than 5 mm. wide.

Lemmas pale or green, not tinged with purple, about 4 mm. long; palea usually exceeding the lemma; Eastern States..... 5. *G. SEPTENTRIONALIS*.

Lemmas slightly tinged with purple near the tip, 5 to 6 mm. long; palea about as long as the lemma, sometimes slightly exceeding it; Northeastern States.

6. *G. FLUITANS*.

Lemmas usually tinged with purple near the tip, 4 to 6 mm. long; palea rarely exceeding the lemma; Western States..... 7. *G. OCCIDENTALIS*.

Culms 15 to 30 cm. tall, slender but rather firm; sheaths open, the margins overlapping; blades with boat-shaped tip, 3 to 5 cm. long, 2 to 3 mm. wide.

8. *G. DECLINATA*.

Section 2. *Hydropoa*

Lemmas with 7 usually prominent nerves; second glume 1-nerved; sheaths, at least the upper, closed from below the summit.

Panicle contracted, narrow.

Lemmas 3 to 4 mm. long; panicle oblong, dense, usually not more than 10 cm. long.

11. *G. OBTUSA*.

Lemmas 2 to 2.5 mm. long; panicle rather loose, nodding, 15 to 25 cm. long.

12. *G. MELICARIA*.

Panicle open, lax.

Nerves of lemma evident but not prominent..... 13. *G. CANADENSIS*.

Nerves of lemma prominent.

First glume not more than 1 mm. long.

Blades 2 to 4 mm. wide, sometimes to 8 mm., rather firm, often folded; first glume 0.5 mm. long..... 14. *G. STRIATA*.

Blades 6 to 12 mm. wide, flat, thin, lax; first glume about 1 mm. long.

15. *G. ELATA*.

First glume more than 1 mm. long, usually about 1.5 mm. long.

Glumes subequal, blunt, pale, in striking contrast to the purple florets.

9. *G. GRANDIS*.

Glumes narrow, acute, the second longer than the first; florets olive green.

10. *G. NUBIGENA*.

Lemmas with 5 prominent nerves; second glume 3-nerved; sheaths open.

Panicle narrow, the branches ascending..... 16. *G. ERECTA*.

Panicle open, lax.

Culms relatively thick, commonly 1 m. tall; blades mostly 8 to 12 mm. wide.

Panicle branches numerous, many-flowered..... 17. *G. PAUCIFLORA*.

Panicle branches few, distant, few-flowered..... 18. *G. OTISII*.

Culms slender, decumbent, weak.

Blades 4 to 8 mm. wide; anthers 1 mm. long..... 19. *G. PALLIDA*.

Blades 1 to 3 mm. wide; anthers 0.2 to 0.5 mm. long..... 20. *G. FERNALDII*.

SECTION 1. *EUGLYCERIA* Griseb.

Spikelets linear, nearly terete, usually more than 1 cm. long, appressed on short pedicels; panicles narrow, erect, the branches appressed or ascending after anthesis. The species of *Euglyceria*, with the exception of *Glyceria acutiflora*, are very closely allied and appear to intergrade.

1. *Glyceria acutiflora* Torr. (Fig. 87.) Culms compressed, lax, creeping



FIGURE 87.—*Glyceria acutiflora*. Panicle, $\times 1$; floret, $\times 10$. (Knowlton 866, Mass.)

and rooting below, 50 to 100 cm. long; blades flat, lax, 10 to 15 cm. long, 3 to 6 mm. wide, scabrous on the upper surface; panicle 15 to 35 cm. long, often partly included, the branches rather stiff, bearing 1 or 2 spikelets, or the lower 3 or more; spikelets 5- to 12-flowered, 2 to 4 cm. long, 1 to 2 mm. wide, the lateral pedicels 1 to 3 mm. long; glumes about 2 and 5 mm. long; lemmas 7-nerved, acute, scabrous, 6 to 8 mm. long, exceeded by the acuminate, 2-toothed paleas. ♀ —Wet soil and shallow water, New Hampshire to Virginia and West Virginia, west to Michigan, Missouri, and Tennessee; also northeastern Asia.

2. *Glyceria borealis* (Nash) Batchelder. NORTHERN MANNAGRASS. (Fig. 88.) Culms erect or decumbent at base, slender, 60 to 100 cm. tall, blades flat or folded, usually 2 to 4 mm. wide, sometimes wider; panicle mostly 20 to 40 cm. long, the branches as much as 10 cm. long, bearing several appressed spikelets; spikelets mostly 6- to 12-flowered, 1 to 1.5 cm. long; glumes about 1.5 and 3 mm. long; lemmas rather thin, obtuse, 3 to 4 mm. long, strongly 7-nerved, scarious at the tip, glabrous between the hispidulous nerves. ♀ —Wet places and shallow water, Newfoundland to southeastern Alaska, Pennsylvania to Illinois, Minnesota, and Washington, and in the mountains to New Mexico, Arizona, and central California.

3. *Glyceria leptostachya* Buckl. (Fig. 89.) Culms 1 to 1.5 m. tall, rather stout or succulent; sheaths slightly rough; blades flat, scaberulous

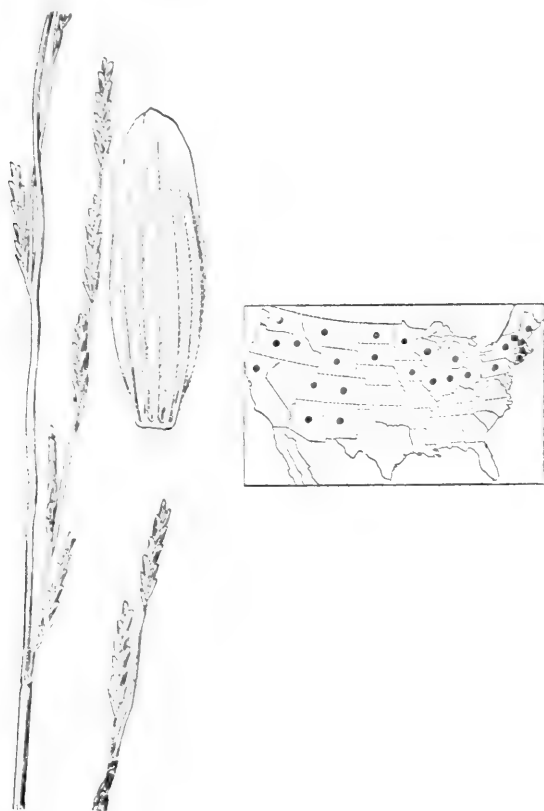


FIGURE 88.—*Glyceria borealis*. Panicle, $\times 1$; floret, $\times 10$. (Fernald 193, Maine.)



FIGURE 89.—*Glyceria leptostachya*. Panicle, $\times 1$; floret, $\times 10$. (Heller 3606, Calif.)

on the upper surface, 4 to 7 mm. rarely to 1 cm. wide; panicle 20 to 40 cm. long, the branches ascending,

mostly in twos or threes, several-flowered, often bearing secondary branchlets; spikelets 1 to 2 cm. long, 8- to 14-flowered, often purplish; glumes 1.5 and 3 mm. long; lemmas firm, broadly rounded toward apex, about 3 mm. long, 7-nerved, scaberulous on the nerves and between them. $\text{\text{2}}$ (*Panicularia davyi* Merr.)—Shallow water, up to 1,200 m., rare, Washington to central California.

4. *Glyceria arkansana* Fernald. (Fig. 90.) Resembling *G. septentrionalis*; first glume 2 to 2.5 mm. long; lemmas 3 to 3.5 mm. long, hirtellous rather than scaberulous. $\text{\text{2}}$ —Wet ground, Louisiana and Arkansas.⁹

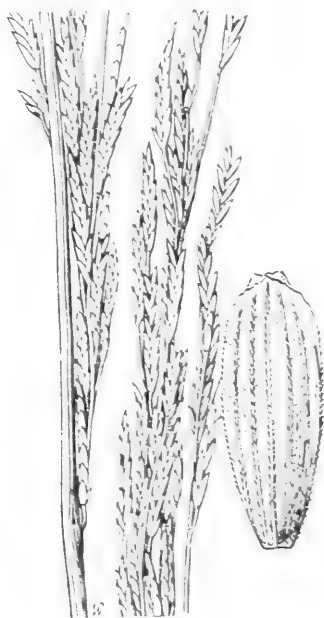


FIGURE 90.—*Glyceria arkansana*. Panicle, $\times 1$; floret, $\times 10$. (Ball 362, La.)

5. *Glyceria septentrionalis* Hitchc. EASTERN MANNAGRASS. (Fig. 91.) Culms 1 to 1.5 m. tall, somewhat succulent; sheaths smooth; blades flat, mostly 10 to 20 cm. long, 4 to 8 mm. wide, usually smooth beneath, slightly scaberulous on the upper surface and margin; panicle 20 to 40 cm. long, somewhat open, the branches as much as 10 cm. long, several-flowered, often spreading at anthesis; spikelets 1 to 2 cm. long, 6- to 12-

⁹A specimen labeled "Western part of New-York," 1840, may have a misplaced label.

flowered, the florets rather loosely imbricate; glumes 2 to 3 and 3 to 4 mm. long; lemmas green or pale, about 4 mm. long, narrowed only slightly at the summit, scaberulous, the paleas usually exceeding them. 2 —Shallow water and wet places, Quebec to Minnesota, south to Georgia and eastern Texas.



FIGURE 91.—*Glyceria septentrionalis*. Panicle, $\times 1$; floret, $\times 10$. (Deam 3184, Ind.)

6. *Glyceria fluitans* (L.) R. Br. MANNAGRASS. (Fig. 92.) Resembling *G. septentrionalis* in habit; first glume usually only one-third as long as the first lemma; lemmas scaberulous, the nerves distinct but not raised prominently above the tissue of the internerves; tip of palea usually exceeding its lemma. 2 (*Panicularia brachyphylla* Nash.)—Shallow water, Newfoundland to Quebec and New York; South Dakota; Eurasia.

7. *Glyceria occidentalis* (Piper) J. C. Nels. (Fig. 93.) Culms flaccid, 60 to 100 cm. tall; blades 3 to 12 mm. wide, smooth beneath, somewhat scabrous on the upper surface; panicle loose, spreading at anthesis, 30 to 50

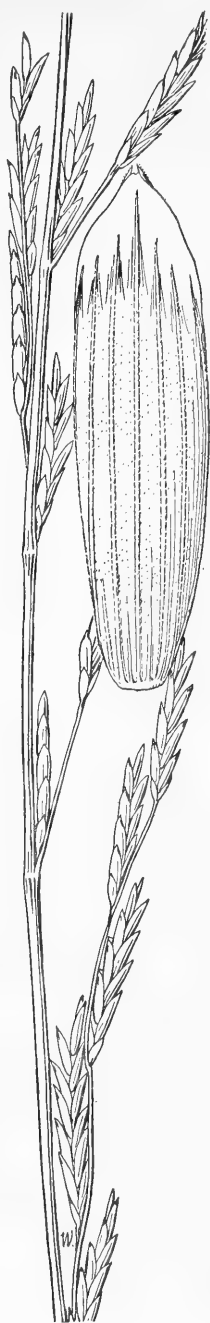


FIGURE 92.—*Glyceria fluitans*. Panicle, $\times 1$; floret, $\times 10$. (McIntosh 1076, S. Dak.)

cm. long; spikelets, 1.5 to 2 cm. long; first glume mostly about 2 mm. long; lemmas usually tinged with purple near the tip, 4 to 6 mm. long, rather strongly scabrous, 7- to 9-nerved, the nerves prominent, raised above the tissue of the internerves; palea about as long as its lemma, sometimes slightly exceeding it. 2 —Marshes, shallow water, and wet places, Idaho to British Columbia,

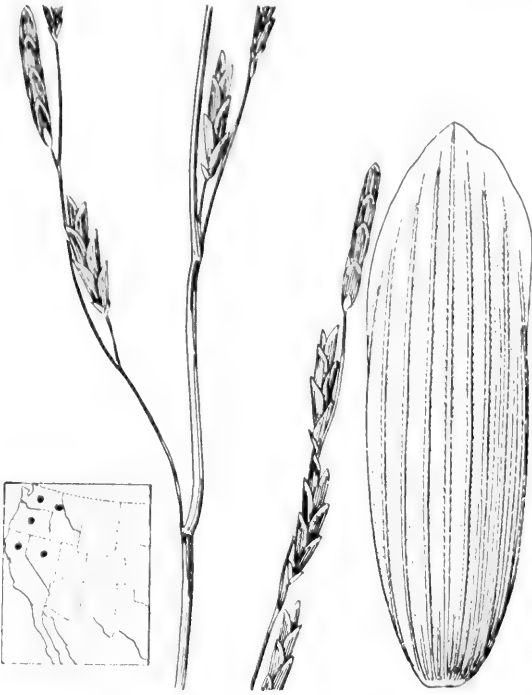


FIGURE 93.—*Glyceria occidentalis*. Panicle, $\times 1$; floret, $\times 10$. (Type.)

northern California and Nevada. The seeds are used for food by the Indians.

8. *Glyceria declinata* Brébiss. (Fig. 94.) Culms 15 to 70 cm. tall, erect from a decumbent branching base; sheaths open, keeled, scaberulous, the margins thin and hyaline; ligule 5 to 7 mm. long; blades 3 to 12 cm. long, 2 to 6 mm. wide, the tip boat-shaped; panicle simple, 6 to 25 cm. long; spikelets 15 to 20 mm. long, appressed;

glumes obtuse, the first 1.8 to 2.2 mm. long, the second 3 to 3.5 mm. long; lemma 4 to 5 mm. long, scabrous, 7-nerved, obtuse, irregularly dentate; palea about as long as the lemma, the keels narrowly winged. ♀ —Moist canyons and meadows, Nevada and California; New York (Long Island); Europe, whence probably introduced.

SECTION 2. *HYDROPSA* Dum.

Spikelets more or less laterally compressed, ovate to oblong, usually not more than 5 mm. long; panicles open or condensed, but not long and narrow (except in *G. melicaria*).

9. *Glyceria grândis* S. Wats.

AMERICAN MANNAGRASS. (Fig. 95.) Culms tufted, stout, 1 to 1.5 m. tall; blades flat, 6 to 12 mm. wide; panicle large, very compound, 20 to 40 cm. long, open, nodding at summit; spikelets 4- to 7-flowered, 5 to 6 mm. long, glumes whitish, about 1.5 and 2 mm. long; lemmas purplish, about 2.5 mm. long; palea rather thin, about as long as the lemma. ♀ (*Panicularia americana* MacM.)—Banks of streams, marshes, and wet places, Prince Edward Island to Alaska, south to Virginia, Tennessee, Iowa, Nebraska, New Mexico, Arizona, and eastern Oregon.

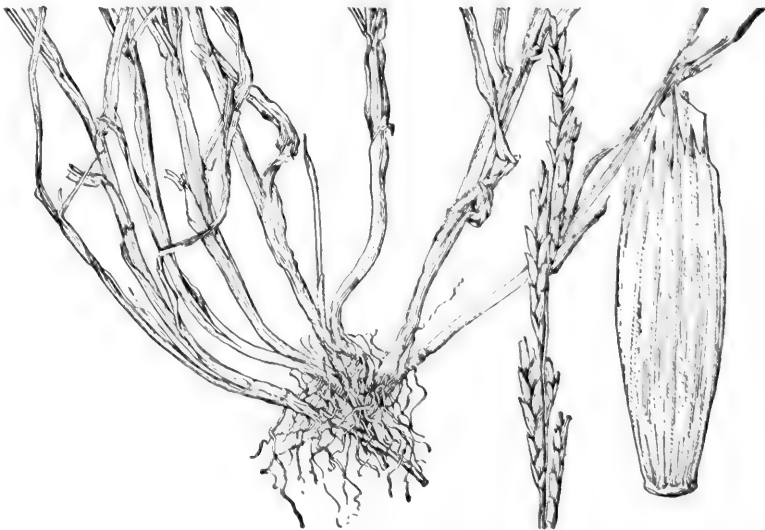


FIGURE 94.—*Glyceria declinata*. Plant, $\times 1$; floret, $\times 10$. (Cooke 15312, Calif.)

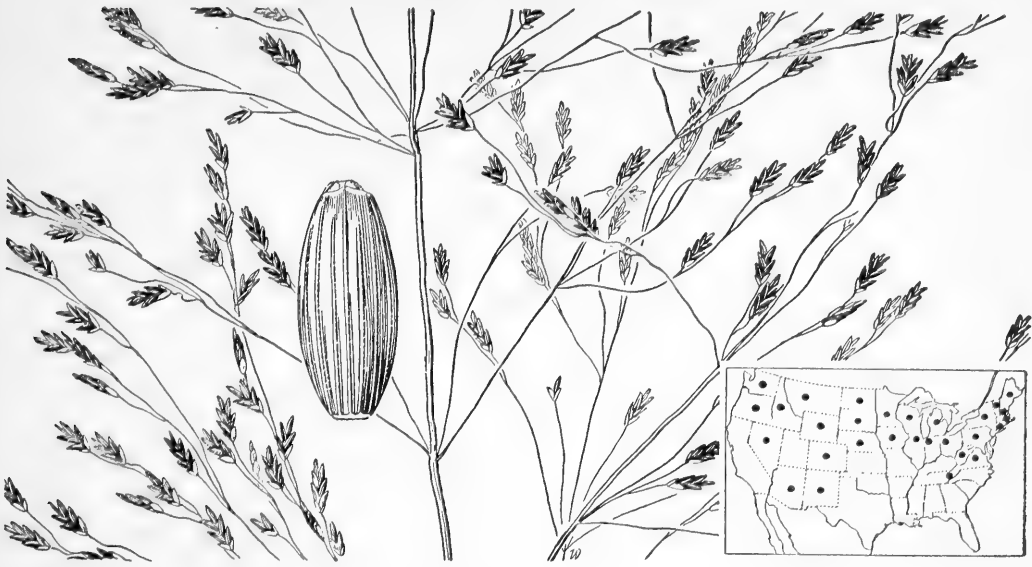


FIGURE 95.—*Glyceria grandis*. Panicle, $\times 1$; floret, $\times 10$. (Pearce, N. Y.)

10. *Glyceria nubigena* W. A. Anderson. (Fig. 96.) Culms 1 to 2 m. tall, slender to rather stout, smooth, shining; sheaths glabrous or scaberrulous, the lower much longer than the internodes; ligule truncate, 1 mm. long; blades as much as 45 cm. long, 6 to 10 mm. wide, smooth below, scabrous above; panicles 20 to 30 cm. long, the branches stiffly spreading or reflexed; spikelets 3- to 4-flowered, the florets early deciduous; lemmas about 2.5 mm. long, obtuse or subacute. ♀ —Moist ground, balds

and high ridges, Great Smoky Mountains, Tennessee and North Carolina.

11. *Glyceria obtusa* (Muhl.) Trin. (Fig. 97.) Culms erect, often decumbent at base, 50 to 100 cm. tall, rather firm; blades elongate, erect, mostly smooth, flat or folded, 2 to 6 mm. wide; panicle erect, oblong or narrowly elliptic, dense, 5 to 15 cm. long, the branches ascending or appressed; spikelets mostly 4- to 7-flowered, 4 to 6 mm. long, green or tawny, the rachilla joints very short; glumes broad, scarious, 1.5 and 2 mm. long; lemmas



FIGURE 96.—*Glyceria nubigena*. Panicle, $\times 1$; floret, $\times 10$. (Barksdale and Jennison 1970, Tenn.)

firm, faintly nerved, smooth, 3 to 4 mm. long, obtuse, the scarious tip narrow, often revolute. 2 —Bogs and marshy places, Nova Scotia to North Carolina, mostly near the coast.

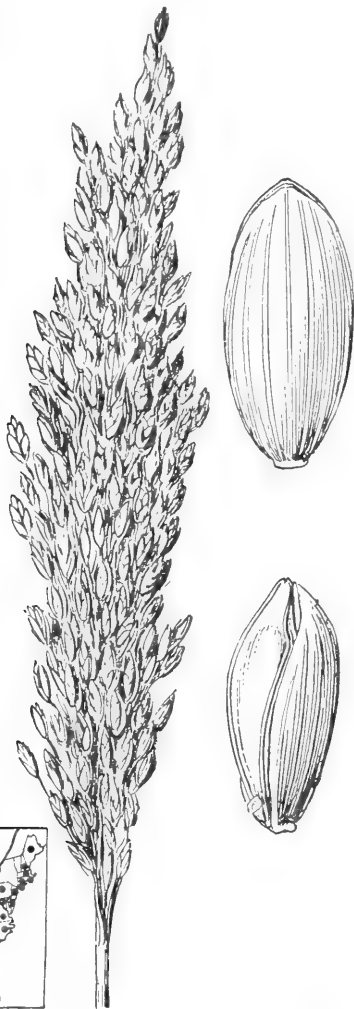


FIGURE 97.—*Glyceria obtusa*. Panicle, $\times 1$; 2 views of floret, $\times 10$. (Miller, N. Y.)

12. *Glyceria melicária* (Michx.) Hubb. (Fig. 98.) Culms slender, solitary or few, 60 to 100 cm. tall; blades elongate, scaberulous, 2 to 5 mm. wide; panicle narrow but rather loose, nodding, 15 to 25 cm. long, the branches erect, rather distant; spikelets 3- or 4-flowered, about 4 mm. long, green; glumes about 1.5 and 2 mm. long, acutish; lemmas firm, 2 to 2.5 mm. long, acutish, smooth, the nerves rather faint. 2 (*G. torreyana* Hitchc.; *Panicularia torreyana*

Merr.)—Swamps and wet woods, New Brunswick to Ohio, south to the mountains of North Carolina.

13. *Glyceria canadensis* (Michx.) Trin. RATTLESNAKE MANNAGRASS. (Fig. 99.) Culms erect, solitary or few in a tuft, 60 to 150 cm. tall; blades scabrous, 3 to 7 mm. wide; panicle open, 15 to 20 cm. long, nearly as wide, the branches rather distant, drooping, naked below; spikelets ovate or oblong, 5- to 10-flowered, 5 to 6 mm. long, the florets crowded, spreading; glumes about 2 and 3 mm. long; lemmas 3 to 4 mm. long, the 7 nerves obscured in the firm tissue of the lemma; palea bowed out on the keels, the floret somewhat tumid. 2 —Bogs and wet places, Newfoundland to Minnesota, south to Virginia and Illinois.

GLYCERIA CANADENSIS var. *LÁXA* (Scribn.) Hitchc. On the average taller, with looser panicles of somewhat smaller 3- to 5-flowered spikelets. 2 (*Panicularia laxa* Scribn.) —Wet places, Nova Scotia to New York, Michigan, Wisconsin, Maryland, West Virginia, North Carolina, and Tennessee.

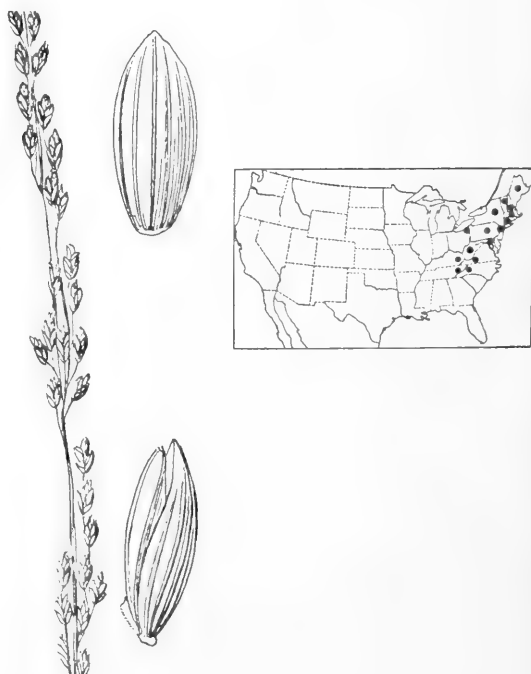


FIGURE 98.—*Glyceria melicaria*. Panicle, $\times 1$; 2 views of floret, $\times 10$. (Harvey 1322, Maine.)



FIGURE 99.—*Glyceria canadensis*. Panicle, $\times 1$; floret, $\times 10$. (Kneucker, Gram. 464, Conn.)

14. *Glyceria striata* (Lam.) Hitchc.

FOWL MANNAGRASS. (Fig. 100.) Plants in large tussocks, pale green; culms erect, slender, rather firm, 30 to 100 cm. tall, sometimes taller; blades erect or ascending, flat or folded, moderately firm, usually 2 to 6 mm. wide, sometimes to 9 mm.; panicle ovoid, open, 10 to 20 cm. long, nodding, the branches ascending at base, drooping, naked below; spikelets ovate or oblong, 3- to 7-flowered, 3 to 4 mm. long, often purplish, somewhat crowded toward the ends of the branchlets; glumes about 0.5 and 1 mm. long, ovate, obtuse; lemmas oblong, prominently 7-nerved, about 2 mm. long, the scarious tip inconspicuous; palea rather firm, about as long as the lemma, the smooth keels prominent, bowed out. ♀ (*G. nervata* Trin.)—Moist meadows and wet places, Newfoundland to British Columbia, south to northern Florida, Texas, Arizona, and northern California; Mexico. A low strict northern form

has been called *G. striata* var. *stricta* Fernald (*G. nervata* var. *stricta* Scribn.)

15. *Glyceria elata* (Nash) Hitchc.
TALL MANNAGRASS. (Fig. 101.) Resembling *G. striata*; plants dark green; culms 1 to 2 m. tall, rather succulent; blades flat, thin, lax, 6 to 12 mm. wide; panicle oblong, 15 to 30 cm. long, the branches spreading, the lower often reflexed; spikelets 6- to 8-flowered, 4 to 6 mm. long; glumes and lemmas a little longer than in *G. striata*. ♀ (*Panicularia nervata elata* Piper.)—Wet meadows, springs, and shady moist woods, Montana to British Columbia, south in the mountains to New Mexico and California.

16. *Glyceria erecta* Hitchc. (Fig. 102.) Culms 10 to 40 cm. tall, sometimes in dense tufts, from slender fragile rhizomes; blades flat, mostly 5 to 12 cm. long, 4 to 9 mm. wide, often equaling the panicle or exceeding it; panicle 3 to 8 cm. long, with ascending or appressed few-flowered



FIGURE 100.—*Glyceria striata*. Plant, $\times \frac{1}{2}$; spikelet, $\times 5$; floret, $\times 10$. (V. H. Chase 60, Ill.)



FIGURE 101.—*Glyceria elata*. Plant, $\times 1$; floret, $\times 10$. (Hitchcock 2731, Calif.)

branches; spikelets 3 to 4.5 mm. long; second glume 3-nerved; lemmas 2.5 to 3 mm. long, scaberulous, the tip somewhat erose. 24 —Springy or boggy places, mostly near or above timber line, Crater Lake, Oreg., to Mount Whitney, Calif., and Glenbrook, Nev.

17. *Glyceria pauciflora* Presl. (Fig. 103.) Culms 50 to 120 cm. tall; sheaths open, smooth or scaberulous, sometimes inflated in floating plants; blades thin, flat, lax, scaberulous, mostly 10 to 15 cm. long, 5 to 15 mm. wide; panicle open or rather dense, nodding, 10 to 20 cm. long, the branches ascending or spreading, rather flexuous, the spikelets crowded on the upper half, the lowermost usually 2 to 4; spikelets mostly 5- or 6-flowered, 4 to 5 mm. long, often purplish; glumes broadly ovate or oval, about 1 and 1.5 mm. long, the margins erose-scarious, the second 3-nerved; lemmas oblong, 2 to 2.5 mm. long,



FIGURE 102.—*Glyceria erecta*. Panicle, $\times 1$; floret, $\times 10$. (Hitchcock 3059, Oreg.)

with 5 prominent nerves and an outer short faint pair near the margins, scaberulous on the nerves and somewhat so between them, the tip rounded, scarious, somewhat erose. 24 —Shallow water, marshes and wet meadows, Alaska to South Dakota, south to California and New

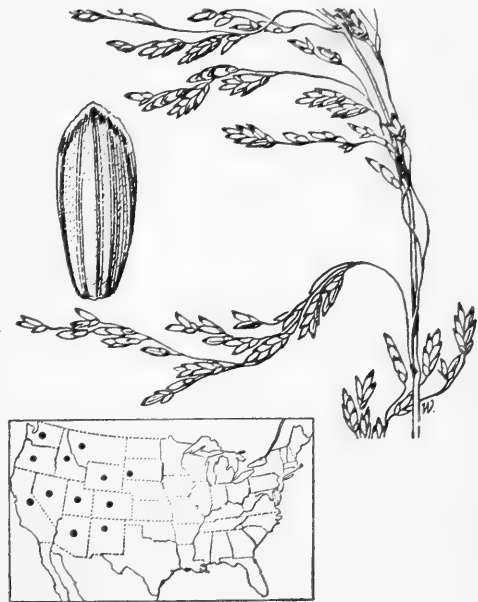


FIGURE 103.—*Glyceria pauciflora*. Panicle, $\times 1$; floret, $\times 10$. (Sandberg, Heller, and McDougal 636, Idaho.)

Mexico, rising in the mountains to timber line.

18. *Glyceria otisii* Hitchc. (Fig. 104.) Culms about 1.25 m. tall; blades flat, lax, 7 to 16 cm. long, 8 to 12 mm. wide; panicle loosely pyramidal, to 18 cm. long, the branches few, drooping; spikelets scarcely compressed, 5- to 6-flowered; glumes 1 and 1.5 mm. long; lemmas broad, especially at the summit, very scabrous, the prominent

hyaline tip contrasting with the purple zone just below, the lower part green. 2 —Timber, Jefferson County, Wash. Known only from the type collection.

19. *Glyceria pallida* (Torr.) Trin. (Fig. 105.) Culms slender, lax, ascending from a decumbent rooting base, 30 to 100 cm. long; sheaths open, blades mostly 4 to 8 mm. wide; panicle pale green, open, 5 to 15 cm. long, the



FIGURE 104.—*Glyceria otisii*. Panicle, $\times 1$; floret, $\times 10$. (Type.)



FIGURE 105.—*Glyceria pallida*. Plant, $\times 1$; floret, $\times 10$. (Pearce, N. Y.)

branches ascending, flexuous, finally more or less spreading; spikelets somewhat elliptic, 4- to 7-flowered, 6 to 7 mm. long; glumes 1.5 to 2 and 2 to 2.5 mm. long, the second 3-nerved; lemmas 2.5 to 3 mm. long, scaberrulous, obtuse, the scarious tip erose; anthers linear, about 1 mm. long; caryopsis with a crown of erect white hairs 0.2 to 0.25 mm. long. ♀ — Shallow cold water, Maine to Wisconsin, south to North Carolina and Missouri. Resembles species of *Poa*.

20. *Glyceria fernaldii* (Hitche.) St. John. (Fig. 106.) Resembling *G. pallida* and appearing to grade into it; culms more slender, 20 to 40 cm. long; blades 1 to 3 mm. wide; panicle on the average smaller, the branches finally spreading or reflexed; spikelets mostly 3- to 5-flowered, 4 to 5 mm. long; glumes and lemmas a little shorter than in *G. pallida*; anthers globose, 0.2 to 0.5 mm. long; crown of hairs of caryopsis 0.1 mm. long. ♀

—Shallow water, Newfoundland to Minnesota, south to Pennsylvania.

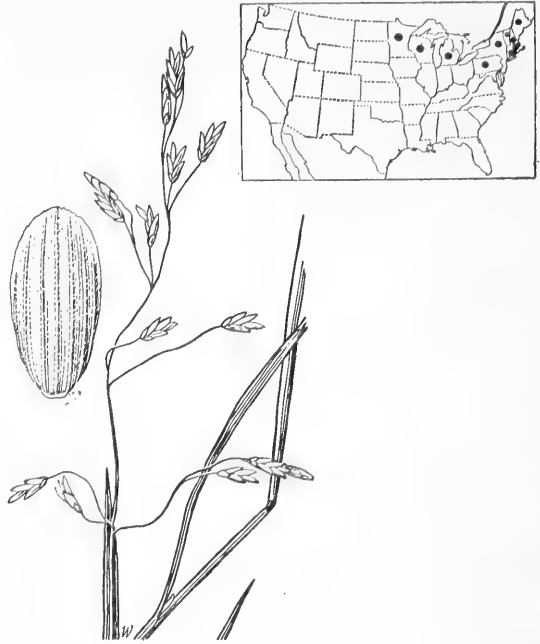


FIGURE 106.—*Glyceria fernaldii*. Plant, $\times 1$; floret, $\times 10$. (Collins, Fernald, and Pease, Quebec.)

8. SCLERÓCHLOA Beauv.

Spikelets 3-flowered, the upper floret sterile; rachilla continuous, broad, thick, the spikelet falling entire; glumes broad, obtuse, rather firm, with hyaline margins, the first 3-nerved, the second 7-nerved; lemmas rounded on the back, obtuse with 5 prominent parallel nerves and hyaline margins; palea hyaline, sharply keeled. Low tufted annual, with broad upper sheaths, folded blades with boat-shaped tips, and dense spikelike racemes, the spikelets subsessile, imbricate in 2 rows on 1 side of the broad thick rachis. Type species, *Sclerochloa dura*. Name from Greek *skleros*, hard, and *chloa*, grass, alluding to the firm glumes.

1. *Sclerochloa dúra* (L.) Beauv. (Fig. 107.) Culms erect to spreading, 2 to 7 cm. long; foliage glabrous, the lower leaves very small, the upper increasingly larger, with broad overlapping sheaths; blades 7 to 18 mm. long, 1 to 3 mm. wide, the upper exceeding the raceme, the junction with the sheath obscure; raceme 1 to 2 cm.

long, nearly half as wide; spikelets 6 to 7 mm. long on very short thick pedicels; first glume about one-third, the second half as long as the spikelets; lower lemma 5 mm. long. ☉ —Dry sandy or gravelly soil, Washington, Oregon, Idaho, Colorado, Utah, and Texas; New York; introduced from southern Europe.

9. SCOLÓCHLOA Link

(*Fluminea* Fries)

Spikelets 3- or 4-flowered, the rachilla disarticulating above the glumes and between the florets; glumes nearly equal, somewhat scarious and lacerate at summit, the first 3-nerved, the second 5-nerved, about as long as the first lemma; lemmas firm, rounded on the back, villous on the callus, 7-nerved, the

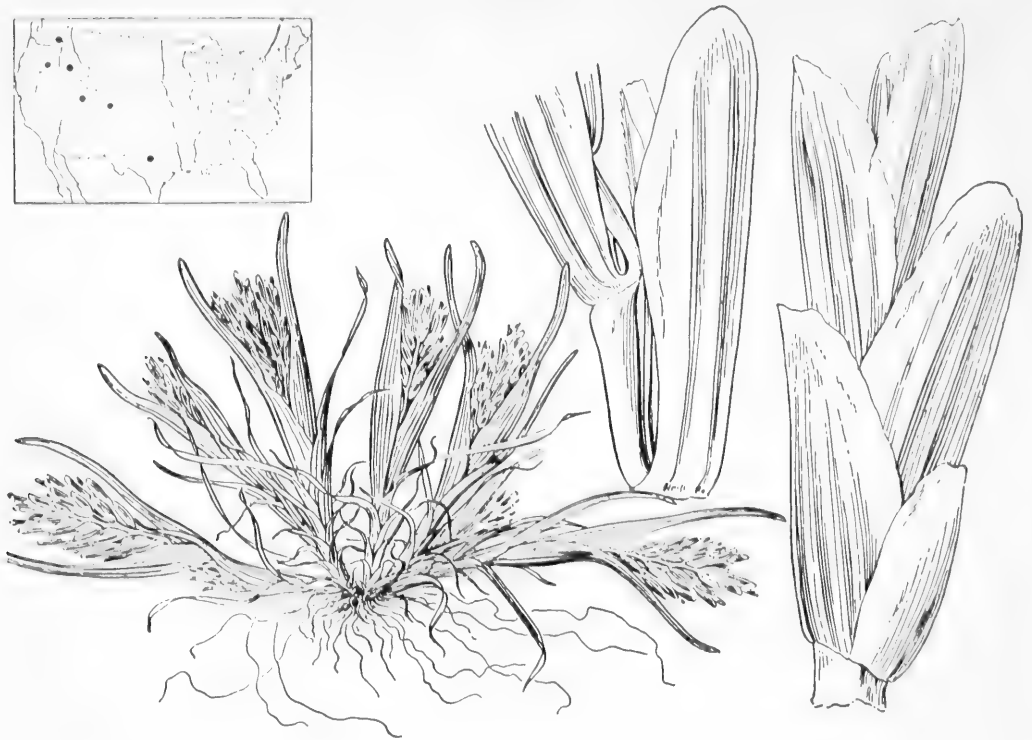


FIGURE 107.— *Sclerochloa dura*. Plant, $\times 1$; spikelet and floret, $\times 10$. (Fallas, Utah.)

nerves rather faint, unequal, extending into a scarious lacerate apex; palea narrow, flat, about as long as the lemma. Tall perennials, with succulent rhizomes, flat blades, and spreading panicles. Type species, *Scolochloa festucacea*. Name from Greek *scolos*, prickle, and *chloa*, grass, alluding to the ex-current nerves of the lemma.

The single species has some value for forage and is often a constituent of marsh hay.

1. *Scolochloa festucacea* (Willd.)

Link. (Fig. 108.) Culms erect, stout, 1 to 1.5 m. tall, from extensively creeping, succulent rhizomes; blades elongate, scabrous on the upper surface, mostly 5 to 10 mm. wide, extending into a fine point; panicle 15 to 20 cm. long, loose, the distant branches fascicled, ascending, naked below, the lower-

most nearly as long as the panicle; spikelets about 8 mm. long, the florets approximate; lemmas about 6 mm. long. 2 — Shallow water and marshes, Manitoba to British Columbia, south to northern Iowa, Nebraska, and eastern Oregon; northern Eurasia.

10. PLEUROPÓGON R. Br. SEMAPHORE-GRASS

Spikelets several- to many-flowered, linear, the rachilla disarticulating above the glumes and between the florets; glumes unequal, membranaceous or subhyaline, scarious at the somewhat lacerate tip, the first 1-nerved, the second obscurely 3-nerved; lemmas membranaceous, 7-nerved, with a round indurate callus, the apex entire or 2-toothed, the midnerve extending into a short mucro or into an awn; keels of the palea winged on the lower half. Soft annuals or perennials, with simple culms, flat blades, and loose racemes of rather large spikelets on a slender flexuous axis. Type species, *Pleuropogon sabinii* R. Br. Name from Greek *pleura*, side, and *pogon*, beard, the palea of the type species having a bristle on each side at the base.

Palatable grasses, but usually too infrequent to be of economic value.



FIGURE 108.—*Scolochloa festucacea*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Griffiths 870, S. Dak.)



FIGURE 109.—*Pleuropogon californicus*. Plant, $\times \frac{1}{2}$; spikelet, $\times 3$; floret, $\times 5$. (Bolander 6075, Calif.)

Keels of palea awned about one-third from the base, the awns 2 to 7 mm. long.

5. *P. OREGONUS.*

Keels of palea awnless.

Lemmas awnless or mucronate, thick, firm, strongly nerved..... 4. *P. DAVYI.*
Lemmas awned, the awns 1 to 12 mm. long.

Lemmas 4 to 6 mm. long, firm, strongly nerved; wings of palea split about half way to the base forming 2 prominent teeth; culms mostly 30 to 60 cm. tall.

1. *P. CALIFORNICUS.*

Lemmas 8 to 9 mm. long, relatively thin, the nerves evident but not prominent; culms mostly more than 1 m. tall.

Spikelets reflexed or spreading; awn of the lemma 5 to 12 mm. long.

2. *P. REFRACTUS.*

Spikelets erect or ascending; awn of the lemma 1 to 2.5 mm. long.

3. *P. HOOVERIANUS.*

1. *Pleuropogon californicus* (Nees)
Benth. ex Vasey. (Fig. 109.) Annual; culms tufted, erect or decumbent at base, 30 to 60 cm. tall; blades flat or folded, seldom more than 10 cm. long, 2 to 5 mm. wide; raceme 10 to 20 cm. long, with 5 to 10 rather distant short-pediceled spikelets; spikelets 6 to 12-flowered, mostly about 2.5 cm. long, erect, or somewhat spreading; glumes obtuse, erose, 4 to 6 mm. long; lemmas scabrous, 5 to 6 mm. long, the nerves prominent, the tip obtuse, scarious, erose, the awn usually 6 to 12 mm. long; wings of palea prominent, cleft, forming a tooth about the middle. ☉ —Wet meadows and marshy ground, Mendocino County to the San Francisco Bay region, California.

2. *Pleuropogon refractus* (A. Gray)
Benth. ex Vasey. NODDING SEMAPHORE-GRASS. (Fig. 110.) Perennial; culms 1 to 1.5 m. tall; blades elongate, the uppermost nearly obsolete, 3 to 7 mm. wide; raceme mostly 15 to 20 cm. long, the spikelets as many as 12, about 3 cm. long, 8- to 12-flowered, finally reflexed or drooping; lemmas about 8 mm. long, subacute, less scabrous and the nerves less prominent than in *P. californicus*; awn 5 to 12 mm. long; palea narrow, keeled to about the middle, scarcely or minutely toothed. ♀ —Bogs, wet meadows, and mountain streams, Washington to Mendocino County, Calif., west of the Cascades.

3. *Pleuropogon hooverianus* (Benson) J. T. Howell. (Fig. 111.) Similar to *P. refractus*, but the spikelets erect

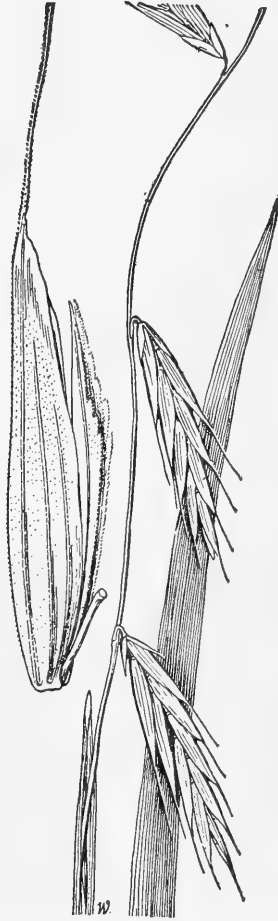


FIGURE 110.—*Pleuropogon refractus*. Plant, $\times 1$; floret, $\times 5$. (Sandberg and Leiberg 734, Wash.)

or ascending; lemmas toothed at the broader hyaline summit, the awn 1 to 2.5 mm. long; wings of palea with a single pointed tooth 1 to 1.5 mm. long; rachilla joints swollen and spongy toward the base. ♀ —Grassy wooded flats, Mendocino and Marin Counties, Calif.

4. *Pleuropogon davyi* Benson. (Fig. 112.) Culms erect from short slender rhizomes, 60 to 100 cm. tall; sheaths



FIGURE 111.—*Pleuropogon hooverianus*. Floret and rachilla joint, $\times 5$. (Dupl. type.)

soft, somewhat inflated, transversely veined; blades 10 to 30 cm. long, 6 to 9 mm. wide, glabrous; raceme 20 to 33 cm. long; spikelets 2 to 5.5 cm. long, 8- to 20-flowered, erect or ascending; lemmas 5.5 to 7.5 mm. long, strongly nerved, obtuse, awnless or mucronate; palea oblong, prominently winged, two-thirds to nearly as long as the lemma. 24 — Wet ground around marshes and creek beds, Sherwood and Walkers Valley (Mendocino County) to Big Valley (Lake County), Calif.



FIGURE 112.—*Pleuropogon davyi*. Floret and rachilla joint, $\times 5$. (Type.)

5. *Pleuropogon oregonus* Chase. (Fig. 113.) Culms 55 to 90 cm. tall, erect from slender rhizomes, soft, spongy, with long internodes; sheaths overlapping, the lower rather loose; ligule 4 to 5 mm. long, lacerate; blades 8 to 18 cm. long, 4 to 7 mm. wide, mucronate, scaberulous; raceme 6 to 16 cm. long; spikelets 1.5 to 4 cm. long, 7- to 13-flowered, ascending;



FIGURE 113.—*Pleuropogon oregonus*. Plant, $\times 1$; floret, $\times 10$. (Type.)

glumes 2 to 4 mm. long, nerveless; lemmas 5.5 to 7 mm. long, obtuse, erose, awn 6 to 10 mm. long; keels of palea with an awn 2 to 7 mm. long, about one-third from the base. 24 — Wet meadows, Union (Union County) and Adel (Lake County), Oreg.

11. *HESPERÓCHLOA* (Piper) Rydb.(Included in *Festuca* L. in Manual, ed. 1)

Spikelets 3- to 5-flowered, the rachilla disarticulating above the glumes and between the florets; glumes subequal or the second longer than the first, shorter than the first floret, lanceolate, acute, the first 1-nerved, the second 3-nerved; lemmas rounded on the back, acute or acuminate, awnless, 5-nerved; palea as long as the lemma, scabrous-ciliate on the keels; stigmas sessile, long and slender; grain beaked, bidentate at the apex. Densely tufted, dioecious, rhizomatous perennial with firm, narrow, flat or loosely involute blades, and narrow erect panicles. Type species, *Hesperochloa kingii*. Name from Greek *esperis*, western, and *chloa*, grass.

1. *Hesperochloa kingii* (S. Wats.) Rydb. (Fig. 114.) Culms in large dense clumps, erect, the rhizomes usually wanting in herbarium specimens; sheaths smooth, striate, the lower reddish brown in age; blades firm, flat, or becoming loosely involute, scabrous on the margins, 3 to 6 mm. wide; panicles 7 to 20 cm. long, the branches short, appressed, the staminate inflorescences denser with somewhat larger spikelets than the pistillate; spikelets 7 to 12 mm. long; glumes thin, shining, acute or subobtuse, the first 3 to 4 mm. long, the second 4 to 6 mm. long; lemmas 5 to 8 mm. long, acute or acuminate, scabrous. ♂ (*Festuca confinis* Vasey; *F. kingii* Cassidy.)—Dry mountains and hills, 2,000 to 3,500 m., Oregon to southern California, east to Montana, Nebraska, and Colorado.



FIGURE 114.—*Hesperochloa kingii*. Plant, $\times \frac{1}{2}$; spikelet, $\times 5$. (Osterhout 1897, Colo.)

12. *POA* L. BLUEGRASS

Spikelets 2- to several-flowered, the rachilla disarticulating above the glumes and between the florets, the uppermost floret reduced or rudimentary; glumes acute, keeled, somewhat unequal, the first usually 1-nerved, the second usually 3-nerved; lemmas somewhat keeled, acute or acutish, rarely obtuse, awnless, membranaceous, often somewhat scarious at the summit, 5-nerved (intermediate nerves, that is, the pair between the keel and the marginal nerves, rarely obsolete), the nerves sometimes pubescent, the callus or base of the lemma in many species with scant to copious cottony hairs, termed "web." Low or rather tall slender annuals or usually perennials with spikelets

in open or contracted panicles, the relatively narrow blades flat, folded, or involute, ending in a boat-shaped tip. Standard species, *Poa pratensis*. Name from Greek, *poa*, grass.

There are several groups of *Poa* that present many taxonomic difficulties. In the groups containing, for example, *P. nervosa*, *P. arctica*, *P. scabrella*, and *P. nevadensis* many species have been proposed which are not here recognized as valid, because they were based upon trivial or variable characters. The keys are based upon average specimens, but the student may find occasional intermediates between the valid species.

The bluegrasses are of great importance because of their forage value, some species being cultivated for pasture and others forming a large part of the forage on the mountain meadows of the West. The most important is *Poa pratensis*, commonly known as bluegrass or Kentucky bluegrass. In the cooler parts of the United States it is cultivated for lawns and is the standard pasture grass in the humid regions where the soil contains plenty of lime. It has been extensively used in the improvement of badly depleted western mountain ranges. *P. compressa*, Canada bluegrass, is cultivated for pasture in the Northeastern States and Canada, especially on poor soils. *P. trivialis* and *P. palustris* are occasionally grown in meadow mixtures, but are of little agricultural importance. *P. arachnifera*, Texas bluegrass, has been used in some parts of the South for winter pasture and as a lawn grass. *P. annua* is a common weed in lawns and gardens. *P. bulbosa* is cultivated about Medford, Oreg., and elsewhere.

With very few exceptions the bluegrasses are palatable and nutritious and are often the most important grasses in many parts of the West. At high altitudes, *P. alpina*, *P. arctica*, *P. epilis*, and *P. rupicola* are important. In the mountains mostly below timber line are found *P. fendleriana* (mutton grass), *P. longiligula*, *P. nervosa*, *P. secunda* (Sandberg bluegrass), *P. canbyi*, and *P. juncifolia*, all of wide distribution. *P. interior* is most abundant in the Rocky Mountains; *P. scabrella* is probably the most important forage grass of the lower elevations in California; *P. gracillima* and *P. ampla* are mostly in the Northwestern States; *P. arida* is the most valuable bluegrass of the Plains. *P. bigelovii*, an annual, is important in the Southwestern States. *P. macrantha* and *P. confinis* are native sandbinders of the sand dunes on the coast of Washington and Oregon, but are not cultivated.

Spikelets little compressed, narrow, much longer than wide, the lemmas convex on the back, the keels obscure, the marginal and intermediate nerves usually faint. All bunchgrasses.

Lemmas crisp-puberulent on the back toward the base (the pubescence sometimes obscure or only at the very base)..... 7. SCABRELLAE.

Lemmas glabrous or minutely scabrous, but not crisp-puberulent..... 8. NEVADENSES.

Spikelets distinctly compressed, the glumes and lemmas keeled.

Plants annual..... 1. ANNUAE.

Plants perennial.

Creeping rhizomes present..... 2. PRATENSES.

Creeping rhizomes wanting.

Lemmas webbed at base (web sometimes scant or obscure in *P. interior*).

3. PALUSTRES.

Lemmas not webbed at base (sometimes sparsely webbed in *P. fernaldiana* and *P. pattersoni*).

Lemmas pubescent on the keel or marginal nerves or both, sometimes pubescent also on the internerves..... 5. ALPINAE.

Lemmas glabrous (minutely pubescent at base in *P. unilateralis* and sometimes in *P. curta*).

Blades narrow, usually involute..... 6. EPILES.

Blades flat, 4 to 8 mm. wide, bright green, often splitting at the apex. Panicles about 15 cm. long with slender spreading branches..... 4. HOMALOPOAE.

1. *Annuae*

Lemmas glabrous, except the scabrous keel, webbed at base. Sheaths glabrous.

1. *P. BOLANDERI*.

Lemmas pubescent.

Lemmas pubescent on the back especially toward the base, but not distinctly villous on the keel and nerves, slightly webbed at base. Sheaths usually scabrous; panicle open.

2. *P. HOWELLII*.

Lemmas pubescent on the nerves, sometimes also on the internerves.

Panicle narrow, contracted, usually interrupted; sheaths scabrous. Lemmas webbed, pubescent on the internerves below..... 3. *P. BIGELOVII*.

Panicle oblong or pyramidal, the branches spreading; sheaths glabrous.

Lemmas with webby hairs at base, distinctly 3-nerved, the intermediate nerves obscure; anthers 0.1 to 0.2 mm. long..... 4. *P. CHAPMANIANA*.

Lemmas not webbed at base, distinctly 5-nerved; anthers 0.5 to 1 mm. long.

5. *P. ANNUA*.

2. *Pratenses*

1a. Culms strongly flattened, 2-edged..... 6. *P. COMPRESSA*.

1b. Culms terete or slightly flattened, not 2-edged.

2a. Plants dioecious.

Panicle oblong, the two sexes unlike in appearance, the pistillate spikelets woolly, the staminate glabrous or nearly so. Plains of Texas..... 7. *P. ARACHNIFERA*.

Panicle oblong or ovoid, the two sexes similar. Seacoast, California and northward.

Glumes and lemmas about 8 mm. long..... 8. *P. MACRANTHA*.

Glumes and lemmas not more than 6 mm. long.

Panicle densely ovoid; lemmas 6 mm. long, slightly villous below.

9. *P. DOUGLASII*.

Panicle somewhat open; lemmas 3 mm. long, scaberulous..... 10. *P. CONFINIS*.

2b. Plants not dioecious, the florets perfect.

3a. Blades involute. Glumes and lemmas 4 to 5 mm. long..... 11. *P. RHIZOMATA*.

3b. Blades flat or folded.

4a. Lemmas not pubescent nor webbed.

Panicle almost spikelike, erect.

Panicle pale, narrow, linear; lemmas scabrous; leaves crowded toward the base, the blades very firm, conduplicate, pungent, curved. Lower sheaths fibrous.

12. *P. FIBRATA*.

Panicle tinged with purple, oblong; lemmas glabrous; leaves not crowded toward the base, the blades flat or sometimes folded, straight, erect.

13. *P. ATROPURPUREA*.

Panicle open, nodding; glumes 3 to 4 mm. long.

Blades broad and short; lower panicle branches reflexed..... 14. *P. CURTA*.

Blades elongate; panicle branches ascending..... 15. *P. NERVOSA*.

4b. Lemmas pubescent.

5a. Lemmas glabrous except for the web at base..... 16. *P. KELLOGGII*.

5b. Lemmas pubescent on the nerves or back, sometimes also webbed at base.

6a. Internerves glabrous, the keel and marginal nerves pubescent.

Lower sheaths retrorsely pubescent, purplish; lemmas pubescent on keel and marginal nerves, not webbed..... 15. *P. NERVOSA*.

Lower sheaths glabrous (scaberulous in *P. laxiflora*); lemmas webbed at base.

Culms retrorsely scabrous..... 17. *P. LAXIFLORA*.

Culms glabrous.

Lower panicle branches in a whorl of usually 5; blades mostly shorter than the culm..... 18. *P. PRATENSIS*.

Lower panicle branches usually in twos, spreading, spikelet-bearing near the ends; blades about as long as the culm..... 19. *P. CUSPIDATA*.

6b. Internerves pubescent near base, the keel and marginal nerves pubescent. Panicle contracted, the branches ascending or appressed (sometimes open in *P. glaucifolia*).

First glume 2.5 to 3 mm. long, 1-nerved; first floret about 3 mm. long; anthers 1.5 mm. long. Plains and alkali meadows at medium altitudes.

20. *P. ARIDA*.

First glume 4 to 5 mm. long, 3-nerved; first floret 5 mm. long; anthers 2.5 mm. long; spikelets mostly shining..... 21. *P. GLAUCIFOLIA*.

Panicle open, the branches spreading.

Blades broad and short; lower panicle branches reflexed.... 14. *P. CURTA*.

Blades 2 to 3 mm. wide; panicle pyramidal, the lower branches horizontal

22. *P. ARCTICA*.

3. *Palustres*

- 1a. Lemmas glabrous, or the keel sometimes pubescent.
 Sheaths retrorsely scabrous. Culms decumbent and often rooting at base; keel of lemma glabrous or slightly pubescent..... 23. *P. TRIVIALIS*.
 Sheaths glabrous.
 Panicle narrow, drooping, the branches appressed or ascending..... 24. *P. MARCIDA*.
 Panicle very open, the few branches slender, naked below, spreading or drooping.
 Lemmas villous on the keel; panicle branches mostly in fours or fives.
 25. *P. ALSODES*.
 Lemmas glabrous on the keel; panicle branches mostly in twos or threes.
 Lemmas obtuse..... 26. *P. LANGUIDA*.
 Lemmas acute..... 27. *P. SALTUENSIS*.
- 1b. Lemmas pubescent on keel and marginal nerves.
 2a. Sheaths distinctly retrorse-scabrous (sometimes faintly so). Culms usually stout, 40 to 120 cm. tall; panicle usually large and open, mostly more than 15 cm. long.
 28. *P. OCCIDENTALIS*.
 2b. Sheaths glabrous or faintly scaberulous.
 3a. Lower panicle branches distinctly reflexed at maturity.
 Panicle oblong, erect, mostly more than 15 cm. long, the branches several (usually more than 3) in a whorl..... 30. *P. SYLVESTRIS*.
 Panicle nodding, mostly less than 15 cm. long, the branches 1 to 3 together.
 31. *P. REFLEXA*.
 3b. Lower panicle branches not reflexed.
 4a. Panicle narrowly pyramidal, erect, 15 to 20 cm. long. Lemmas 4 mm. long, pubescent on nerves and internerves; webbed at base; New Mexico.
 29. *P. TRACYI*.
 4b. Panicle broadly pyramidal, usually nodding.
 5a. Intermediate nerves of lemma distinct..... 32. *P. WOLFII*.
 5b. Intermediate nerves of lemma obscure (distinct in *P. leptocoma*).
 6a. Lower panicle branches in pairs, elongate, capillary, bearing a few spikelets near the ends.
 Spikelets rather broad, the rachilla joints short, hidden by the florets; sheaths smooth; culms in dense tufts; alpine rocky slopes.
 33. *P. PAUCISPICULA*.
 Spikelets narrow, the rachilla joints slender, somewhat elongate, usually not hidden by the florets; sheaths minutely roughened; culms solitary or in small tufts; shady bogs.
 Intermediate nerves of lemma distinct; uppermost ligule acute, 3 to 4 mm. long; western mountains below timber line..... 34. *P. LEPTOCOMA*.
 Intermediate nerves of lemma obscure; uppermost ligule truncate, 0.3 to 1.5 mm. long; Great Lakes region at low altitudes.
 35. *P. PALUDIGENA*.
- 6b. Lower panicle branches often more than 2, if only 2 not capillary and elongate.
 Florets usually converted into bulblets with dark purple base; culms swollen and bulblike at base..... 36. *P. BULBOSA*.
 Florets normal; culms not bulblike at base.
 Glumes narrow, acuminate, about as long as the first lemma; ligule very short..... 37. *P. NEMORALIS*.
 Glumes lanceolate, acute, shorter than the first lemma; ligules rather prominent, those of the culm leaves 1 to 3 mm. or more long.
 Spikelets about 6 mm. long; lemmas 4 mm. long 38. *P. MACROCLADA*.
 Spikelets about 4 mm. long; lemmas 2.5 to 3 mm. long.
 Culms decumbent at the purplish base; panicle 10 to 30 cm. long, large and open..... 39. *P. PALUSTRIS*.
 Culms erect from a green or tawny base; panicle mostly less than 10 cm. long, comparatively small and few-flowered..... 40. *P. INTERIOR*.

4. *Homalopoae*

- One species..... 41. *P. CHAIXII*.

5. *Alpinae*

Blades folded or involute, firm, rather stiff.

Ligule very short, not noticeable when viewed from the side of sheath.

42. *P. FENDLERIANA*.

- Ligule prominent, easily seen in side view, 5 to 7 mm. long..... 43. *P. LONGILIGULA*.
 Blades flat or, if involute, rather lax or soft.
 Panicle branches slender, spreading or drooping, the lower naked and simple for 3 to 4 cm. or more..... 44. *P. AUTUMNALIS*.
 Panicle branches not long and spreading.
 Panicle broadly pyramidal, condensed, about as broad as long, the lower branches spreading. Spikelets broad, subcordate..... 45. *P. ALPINA*.
 Panicle longer than broad.
 Panicle nodding, the lower branches slender, arcuate-drooping..... 46. *P. STENANTHA*.
 Panicle erect, the lower branches short (see also *P. gracillima*).
 Panicle rather loose, lower branches naked below, ascending (see also *P. macrolada*).
 Plants glaucous, culms flattened; panicle rather narrow.
 Spikelets 2- or 3-flowered; panicle 3 to 7 cm. long..... 47. *P. GLAUCA*.
 Spikelets 3- to 6-flowered; panicle 6 to 16 cm. long..... 48. *P. GLAUCANTHA*.
 Plants not glaucous; culms terete, rather lax..... 49. *P. FERNALDIANA*.
 Panicle narrow, condensed, the branches short (see also *P. unilateralis*).
 Culms rather lax; ligule minute; glumes about 4 mm. long..... 50. *P. PATTERSONI*.
 Culms stiff, ligule about 1.5 mm. long, glumes about 3 mm. long..... 51. *P. RUPICOLA*.

6. *Epiles*

- Panicle open, 10 to 15 cm. long. Blades involute, slender..... 52. *P. INVOLUTA*.
 Panicle contracted or, if open, less than 10 cm. long.
 Blades scabrous, filiform, mostly basal.
 Spikelets 7 to 9 mm. long; lemmas 4.5 to 6 mm. long, mostly smooth..... 53. *P. CUSICKII*.
 Spikelets 6 to 7 mm. long; lemmas about 4 mm. long, scabrous..... 54. *P. NAPENSIS*.
 Blades glabrous.
 Lemmas minutely pubescent at base..... 55. *P. UNILATERALIS*.
 Lemmas glabrous.
 Blades of the culm 2 to 3 mm. wide, flat, those of the innovations slender and filiform..... 56. *P. EPILIS*.
 Blades of the culm and innovations similar. Panicle few-flowered.
 Panicle short, open, the capillary branches bearing 1 or 2 spikelets. Culms 10 to 20 cm. tall..... 57. *P. VASEYOCHLOA*.
 Panicle narrow.
 Lemmas 5 to 6 mm. long; panicle usually pale or silvery..... 58. *P. PRINGLEI*.
 Lemmas less than 4 mm. long; panicle usually purple.
 Glumes about as long as the first and second florets; panicle mostly not exceeding the short soft blades.
 Glumes and lemmas smooth, the lemmas erose at summit..... 59. *P. LETTERMANI*.
 Glumes and lemmas scabrous, the lemmas acute, scarcely erose..... 60. *P. MONTEVANSI*.
 Glumes shorter than the first floret; panicle usually much longer than the usually stiff blades..... 61. *P. LEIBERGII*.

7. *Scabrellae*

- Sheaths somewhat scabrous..... 62. *P. SCABRELLA*.
 Sheaths glabrous.
 Panicle rather open, the lower branches naked at base, ascending or somewhat spreading; culms usually decumbent at base..... 63. *P. GRACILLIMA*.
 Panicle contracted, the branches appressed or at anthesis somewhat spreading.
 Culms slender, on the average less than 30 cm. tall; numerous short innovations at base. Blades usually folded..... 64. *P. SECUNDA*.
 Culms stouter, on the average more than 50 cm. tall; innovations usually not numerous..... 65. *P. CANBYI*.

8. *Nevadenses*

- Sheaths scaberulous. Ligule long, decurrent..... 66. *P. NEVADENSIS*.
 Sheaths glabrous.
 Ligule prominent; blades broad and short..... 67. *P. CURTIFOLIA*.
 Ligule short; blades elongate.
 Blades involute..... 68. *P. JUNCIFOLIA*.
 Blades flat..... 69. *P. AMPLA*.

1. **Ánnuae.**—Annuals; culms seldom more than 50 cm. tall; panicles open (contracted in *P. bigelovii*).

1. ***Poa bolandéri*** Vasey. (Fig. 115.) Culms erect, 15 to 60 cm. tall; sheaths glabrous; blades relatively

short, 3 to 5 mm. wide, abruptly narrowed at tip; panicle about half the length of the entire plant, at first contracted, finally open, the branches few, distant, glabrous, stiffly spreading, naked below; spikelets usually 2- or 3-flowered, the internodes of the rachilla long; glumes broad, 2 and 3 mm. long; lemma scantily webbed at base, acute, the marginal nerves rather indistinct, the intermediate nerves obsolete. ☉

—Open ground or open woods, 1,500 to 3,000 m., Washington and Idaho to western Nevada and the southern Sierras in California.

2. ***Poa howéllii*** Vasey and Scribn. HOWELL BLUEGRASS. (Fig. 116.) Culms 30 to 85 cm. tall; sheaths retrorsely scabrous to glabrous; blades wider than in *P. bolanderi*, gradually acuminate; panicle one-third to half the entire height of the plant, open, the branches in rather distant fascicles, spreading, scabrous, naked below, some short branches intermixed; spikelets 3 to 5 mm. long, usually 3- or 4-flowered; glumes narrow, acuminate, 1.5 and 2 mm. long; lemmas webbed at base, 2 to 3 mm. long, ovate-lanceolate, pubescent on the lower part, the nerves all rather distinct. ☉ —Rocky banks and shaded slopes, mostly less than 1,000 m., Vancouver Island to southern California, especially in the Coast Ranges.

3. ***Poa bigelóvii*** Vasey and Scribn. BIGELOW BLUEGRASS. (Fig. 117.) Culms erect, 15 to 35 cm. tall; blades 1 to 5 mm. wide; panicle narrow, interrupted, 7 to 15 cm. long, the branches short, appressed; spikelets about 6 mm. long; glumes acuminate, 4 mm. long, 3-nerved; lemmas about 3 mm. long, sometimes 4 mm., webbed at base, conspicuously pubescent on the lower part of keel and lateral nerves, sometimes sparsely pubescent on lower part of internerves. ☉ —Open ground, at medium altitudes, Oklahoma and western Texas to Colorado, Nevada, and southern California; northern Mexico.



FIGURE 115.—*Poa bolandéri*. Panicle, $\times 1$; floret, $\times 10$. (Swallen 799, Calif.)

4. *Poa chapmaniána* Scribn. (Fig. 118.) Plant drying pale or tawny; culms densely tufted, slender, 10 to 30 cm. tall; blades 1 to 1.5 mm. wide; panicle oblong-pyramidal, 3 to 8 cm. long, open, the lower branches spreading; spikelets 3 to 4 mm. long, mostly 3- to 5-flowered; glumes 2 and 2.5



FIGURE 116.—*Poa howellii*. Panicle, $\times 1$; floret, $\times 10$. (Suksdorf 10464, Wash.)

mm. long; lemmas about 2 mm. long, webbed at base, strongly pubescent on the keel and lateral nerves, the intermediate nerves obscure; anthers 0.1 to 0.2 mm. long. \odot —Open ground and cultivated fields, Massachusetts and New York; Delaware to Nebraska, Florida and Texas.



FIGURE 117.—*Poa bigelovii*. Panicle, $\times 1$; floret, $\times 10$. (Fendler 931, N. Mex.)



FIGURE 118.—*Poa chapmaniána*. Panicle, $\times 1$; floret, $\times 10$. (V. H. Chase 3557, Ill.)

5. *Poa annua* L. ANNUAL BLUE-GRASS. (Fig. 119.) Tufted, bright green, erect to spreading, sometimes rooting at the lower nodes, usually 5 to 20 cm. tall, sometimes taller, forming mats; culms flattened; blades soft, lax, mostly 1 to 3 mm. wide; panicle pyramidal, open, 3 to 7 cm. long; spikelets crowded, 3- to 6-flowered, about 4 mm. long; first glume 1.5 to 2, the second 2 to 2.5 mm. long; lemmas not webbed at base, distinctly 5-nerved, more or less pubescent on the lower half of all the nerves, the long hairs on the lower part of the keel sometimes simulating a web; anthers 0.5 to 1 mm. long. ☉ —Open ground, lawns, pastures, waste places, and openings in woods, Newfoundland and Labrador to Alaska, south to Florida and California; tropical America at high altitudes; introduced from Europe. In warmer parts of the United States the species thrives in the winter; in intermediate latitudes it is a troublesome weed in lawns, growing luxuriantly in spring, dying in early summer and leaving unsightly patches. Occasionally found in flooded places and stream banks, the culms spreading.

2. *Pratenses*.—Perennials with slender creeping rhizomes. Several species dioecious.

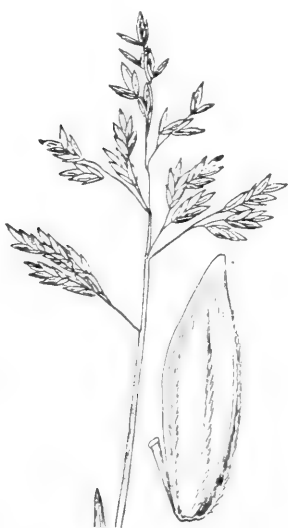


FIGURE 119.—*Poa annua*. Panicle, $\times 1$; floret, $\times 10$. (Hitchcock, D. C.)



FIGURE 120.—*Poa compressa*. Panicle, $\times 1$; floret, $\times 10$. (Gayle 750, Maine.)

6. *Poa compressa* L. CANADA BLUE-GRASS. (Fig. 120.) Culms solitary or few together, often gregarious, strongly flattened, wiry, decumbent at base, bluish green, 15 to 70 cm. tall; blades mostly rather short, 1 to 4 mm. wide; panicle narrow, 3 to 10 cm. long, the usually short branches in pairs, spikelet-bearing to the base; spikelets crowded, subsessile, 3- to 6-flowered, 4 to 6 mm. long; glumes 2 to 3 mm. long; lemmas firm, 2 to 3 mm. long, the web at base scant or wanting, the keel and marginal nerves slightly pubescent toward base, the intermediate nerves obscure. 2! —Open ground, open woods, meadows, and waste places, Newfoundland to Alaska, south to Georgia, Tennessee, Alabama, Oklahoma, New Mexico, and California; introduced from Europe. Cultivated for pastures in poor soil.

7. *Poa arachnifera* Torr. TEXAS BLUEGRASS. (Fig. 121.) Plants dioecious; culms tufted, 30 to 75 cm. tall; blades mostly 2 to 4 mm. wide, scabrous above; panicle narrow, compact, more or less lobed or interrup-

ted, 5 to 12 cm. long; spikelets mostly 5- to 10-flowered, the pistillate conspicuously cobwebby, the lemmas 5 to 6 mm. long, acuminate, copiously long webby at base, the strongly compressed keel and lateral nerves ciliate-fringed along the lower half; staminate lemmas glabrous or with a scant web at base. 21 —Prairies

sively creeping rhizomes, and also long runners creeping over the sand, 15 to 40 cm. tall; sheaths tawny, papery; blades involute, subflexuous; panicle contracted, sometimes dense and spikelike, 5 to 12 cm. long, pale or tawny; spikelets about 12 mm. long, about 5-flowered; glumes 3-nerved, or the second indistinctly 5-



FIGURE 121.—*Poa arachnifera*. Plant and pistillate (♀) and staminate (♂) panicles, $\times 1$; pistillate (♀) and staminate (♂) florets, $\times 10$. (Blackman, Tex.)

and plains, southern Kansas to Texas and Arkansas; introduced eastward to North Carolina and Florida; Idaho. Sometimes cultivated for winter pasture.

8. *Poa macrantha* Vasey. (Fig. 122.) Plants dioecious; culms erect from a decumbent base, with exten-

nerved, about 8 mm. long; lemmas about 8 mm. long, short-webbed at base, pubescent on the keel and marginal nerves below, slightly scabrous on the keel above; pistillate florets with abortive stamens. 21 —Sand dunes along the coast, Washington to northern California.



FIGURE 122. *Poa macrantha*. Plant, $\times 1$; floret, $\times 10$. (Hitchcock 2822, Oreg.)

9. *Poa douglasii* Nees. (Fig. 123.) Plants dioecious, the two kinds similar; culms ascending from a decumbent base, usually less than 30 cm. tall; rhizomes slender; sheaths glabrous, tawny and papery; blades involute, some of them usually exceeding the culm; panicle ovoid, dense, spikelike, 2 to 5 cm. long, 1 to 2 cm. wide, pale or purplish; spikelets 6 to 10 mm. long, about 5-flowered; glumes broad, 3-nerved, 4 to 6 mm. long; lemmas 6 to 7 mm. long, slightly webbed at base, pubescent on the lower part of the keel and marginal nerves, scabrous on the upper part of the keel, usually with 1 to 3 pairs of intermediate nerves. 21 — Sand dunes near the coast, California, Point Arena to Monterey.

10. *Poa confinis* Vasey. (Fig. 124.) Plants dioecious, the two kinds similar; culms often geniculate at base, usually less than 15 cm. tall, sometimes as much as 30 cm.; blades involute, those of the innovations

numerous; panicle narrow, 1 to 3 cm. long, tawny, the short branches ascending or appressed; spikelets 4 to 5 mm. long, mostly 3- or 4-flowered; glumes unequal, the second 3 mm. long; lemmas 3 mm. long, scabrous, sparsely webbed at base, the nerves faint; pistillate florets with minute abortive anthers, the staminate often with rudimentary pistil. 24 — Sand dunes and sandy meadows near the coast, British Columbia to Mendocino County, Calif.



FIGURE 123.—*Poa douglasii*. Plant, $\times 1$; floret, $\times 10$. (Bolander 6074, Calif.)

11. *Poa rhizomata* Hitchc. (Fig. 125.) Culms tufted with numerous innovations, 40 to 60 cm. tall; lower sheaths usually scabrous with a puberulent collar; ligule rather prominent on the culm leaves, inconspicuous on the leaves of the innovations; blades involute or sometimes flat,

firm, less than 1 mm. thick, flexuous, mostly basal, 2 on the culm, usually puberulent on the upper surface; panicle open, 5 to 8 cm. long, the lower branches mostly in pairs, 2 to 3 cm. long; spikelets, 3- to 5-flowered, 6 to 10 mm. long; glumes 3 to 5 mm.



FIGURE 124.—*Poa confinis*. Plant, $\times 1$; floret, $\times 10$. (Piper 4910, Wash.)

long; lemmas 4 to 5 mm. long, with a rather short web at the base, scabrous at least on the rather distinct nerves, pubescent on the lower part of keel. 2 —Dry slopes, southwestern Oregon and northwestern California; apparently rare.



FIGURE 125.—*Poa rhizomata*. Plant, $\times 1$; floret, $\times 10$. (Type.)

12. *Poa fibrata* Swallen. (Fig. 126.) Culms 15 to 35 cm. tall, erect from an ascending base; lower sheaths thin, smooth and shining; ligule 1 to 1.5 mm. long; blades 4 to 8 cm. long, firm, conduplicate, curved, pungent, scabrous; panicles 4 to 10 cm. long, dense, the short appressed branches floriferous to the base; spikelets 3- to 4-flowered, 5 to 6 mm. long; lemmas 2.5 to 3 mm. long, acute or subobtuse, glabrous or obscurely pubescent toward the base. 2 —Saline flats, Shasta Valley, Siskiyou County, Calif.

13. *Poa atropurpurea* Scribn. (Fig. 127.) Culms erect, 30 to 40 cm. tall;



FIGURE 126.—*Poa fibrata*. Plant, $\times 1$; floret, $\times 10$. (Type.)

FIGURE 127.—*Poa atropurpurea*. Plant, $\times 1$; floret, $\times 10$. (Type.)

blades mostly basal, the uppermost culm leaf below the middle of the culm, folded or involute, firm; panicle contracted, almost spikelike, purpletinged, 3 to 5 cm. long; spikelets 3 to 4 mm. long, rather thick; glumes broad, less than 2 mm. long; lemmas about 2.5 mm. long, broad, glabrous, not webbed at base, the nerves faint.

21 —Known only from Bear Valley, San Bernardino Mountains, Calif.

14. *Poa cúrta* Rydb. (Fig. 128.) Culms few in a loose tuft, 40 to 80 cm. tall, rather lax; sheaths glabrous or minutely roughened; ligule trun-



cate, about 1 mm. long; blades 3 to 6 mm. wide; panicle open, 5 to 15 cm. long, nodding, the rather distant branches spreading or reflexed, naked below; spikelets 5 to 10 mm. long, 2- to 6-flowered; lemmas lanceolate, subacute, slightly scaberulous, sometimes slightly pubescent on the back at base, without a web, 4 to 5.5 mm.

open, usually 5 to 10 cm. long, the apex nodding, the branches mostly in twos or threes, naked below; lemmas rather strongly nerved, glabrous or pubescent on the lower part of the nerves. ♀ (*P. wheeleri* Vasey; *P. olneyae* Piper.)—Open woods at medium altitudes, Alberta and British Columbia, south in the mountains to



FIGURE 128.—*Poa curta*. Panicle, $\times 1$; floret, $\times 10$. (Jones 5573, Utah.)

long, rather strongly nerved or intermediate nerves faint. ♀ —Moist shady places at medium altitudes, western Wyoming, southern Idaho, and Utah.

15. *Poa nervosa* (Hook.) Vasey. **WHEELER BLUEGRASS.** (Fig. 129.) Culms erect, 30 to 60 cm. tall; sheaths glabrous or the lower retrorsely pubescent, often purple, the collar often puberulent; ligule 1 to 2 mm. long; blades sometimes folded; panicle

Colorado, New Mexico, and California. Typical *P. nervosa* (including *P. olneyae*) found mostly in Washington and Oregon, has glabrous to scaberulous strongly nerved lemmas, glabrous sheaths, and a loose open panicle, the capillary lower branches in whorls of 3 or 4, drooping, as much as 8 cm. long; typical *P. wheeleri*, originally described from Colorado, has firmer, less strongly nerved lemmas, more or less pubescent on the



FIGURE 129.—*Poa nervosa*. A, Plant, $\times 1$. (Suksdorf 10364, Wash.) B, Floret, $\times 10$. (Type of *P. wheeleri*.) C, Floret, $\times 10$. (Type of *P. nervosa*.)



FIGURE 130.—*Poa kelloggii*. Plant, $\times 1$; floret, $\times 10$. (Kellogg and Bolander 14, Calif.)

lower part of the keel and marginal nerves, and purplish retrorsely pubescent lower sheaths. These characters are not coordinated, and the forms grade into each other, both as to characters and range.

16. *Poa kellooggii* Vasey. (Fig. 130.) Culms 30 to 60 cm. tall; sheaths slightly scabrous; blades flat or folded, 2 to 4 mm. wide; panicle pyramidal, open, 7 to 15 cm. long, the

branches mostly solitary or in twos, spreading or reflexed, bearing a few spikelets toward the ends; spikelets rather loosely flowered, 4 to 6 mm. long; glumes 3 and 4 mm. long; lemmas acute or almost cuspidate, 4 to 5 mm. long, glabrous, rather obscurely nerved, conspicuously webbed at base. σ —Moist woods and shady places, Coast Ranges from Corvallis, Oreg., to Santa Cruz County, Calif.



FIGURE 131.—*Poa laxiflora*. Plant, $\times 1$; floret, $\times 10$. (Hitchcock 23468, Wash.)

17. *Poa laxiflora* Buckl. (Fig. 131.) Culms retrorsely scabrous, 100 to 120 cm. tall; sheaths slightly retrorse-

scabrous; ligule 3 to 5 mm. long; blades lax, 2 to 4 mm. wide; panicle loose, open, nodding or drooping, 10



FIGURE 132.—*Poa pratensis*. Plant, $\times \frac{1}{2}$; spikelet, $\times 5$; floret, $\times 10$. (Williams, S. Dak.)

to 15 cm. long, the lower branches in whorls of 3 or 4; spikelets 3- or 4-flowered, 5 to 6 mm. long; lemmas about 4 mm. long, webbed at base, rather sparsely pubescent on lower part of the nerves. 2 —Moist

woods, southeastern Alaska (Cape Fox, Hot Springs), Sol Duc Hot Springs, Olympic Mountains, Wash. Sauvies Island (near Portland), Oreg.

18. *Poa pratensis* L. KENTUCKY BLUEGRASS. (Fig. 132.) Culms tufted, erect, slightly compressed, 30 to 100 cm. tall; sheaths somewhat keeled; ligule about 2 mm. long; blades soft, flat or folded, mostly 2 to 4 mm. wide, the basal often elongated; panicle pyramidal or oblong-pyramidal, open, the lowermost branches usually in a whorl of 5, ascending or spreading, naked below, normally 1 central long one, 2 shorter lateral ones and 2 short intermediate ones; spikelets crowded, 3- to 5-flowered, 3 to 6 mm. long; lemmas copiously webbed at base, silky-pubescent on lower half or two-thirds of the keel and marginal nerves, the intermediate nerves distinct, glabrous. 2 —Open woods, meadows, and open ground, widely distributed throughout the United States

and northward, except in arid regions, found in all the States (but not common in the Gulf States) and at all altitudes below alpine regions; introduced from Europe. Bluegrass is commonly cultivated for lawns and pasture in the humid northern parts of the United States.

19. *Poa cuspidata* Nutt. (Fig. 133.) Culms in large lax tufts, 30 to 50 cm. tall, scarcely longer than the basal blades; blades lax, 2 to 3 mm. wide, abruptly cuspidate-pointed; panicle 7 to 12 cm. long, open, the branches mostly in pairs, distant, spreading, spikelet-bearing near the ends; spikelets 3- or 4-flowered; lemmas 4 to 6 mm. long, tapering to an acute apex, webbed at base, sparingly pubescent on the keel and marginal nerves, the intermediate nerves distinct, glabrous. 2 (*P. brachyphylla* Schult.) —Rocky woods, New York, New Jersey to Ohio, south to Georgia and Alabama.

20. *Poa árida* Vasey. PLAINS BLUEGRASS. (Fig. 134.) Culms erect, 20 to 60 cm. tall; blades mostly basal, firm, folded, usually 2 to 3 mm. wide, a single culm leaf usually below the middle of the culm, its blade short;



FIGURE 133.—*Poa cuspidata*. Panicle, $\times 1$; floret, $\times 10$. (Smith 27, Pa.)



FIGURE 134.—*Poa árida*. Panicle, $\times 1$; floret, $\times 10$. (Jones, Colo.)

panicle narrow, somewhat contracted, 2 to 10 cm. long, the branches appressed or ascending; spikelets rather thick, 5 to 7 mm. long, 4- to 8-flowered; lemmas 3 to 4 mm. long, densely villous on the keel and marginal nerves and more or less villous on the lower part of the intermediate nerves. ♀ (*P. sheldoni* Vasey.)—Prairies, plains, and alkali meadows, up to 3,000 m., Manitoba to Alberta, south to western Iowa, Texas, and New Mexico.

21. *Poa glaucifolia* Scribn. and Will. (Fig. 135.) Plants glaucous; culms in loose tufts, 60 to 100 cm. tall; blades 2 to 3 mm. wide; panicle narrow, open, mostly 10 to 20 cm. long, the branches usually in somewhat distant whorls, mostly in threes, ascending, very scabrous, naked below; spikelets 2- to 4-flowered; glumes



FIGURE 135.—*Poa glaucifolia*. Panicle, $\times 1$; floret, $\times 10$. (Rydberg 3288, Mont.)

4 to 5 mm. long; lemmas about 4 mm. long, villous on the lower half of the keel and marginal nerves and more or less so on the intermediate nerves below. ♀ —Moist places, ditches, and open woods at medium altitudes, British Columbia and Alberta through Idaho to Minnesota, Nebraska, New Mexico, Arizona, and Nevada.

22. *Poa ártica* R. Br. ARCTIC BLUEGRASS. (Fig. 136.) Culms loosely tufted, erect from a decumbent base,

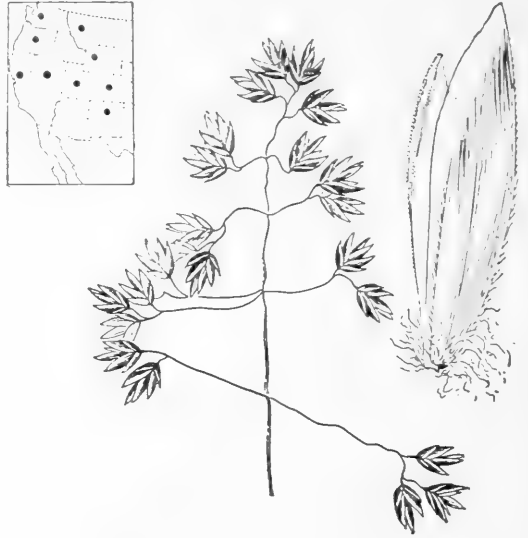


FIGURE 136.—*Poa ártica*. Panicle, $\times 1$; floret, $\times 10$. (Sewall 244, Baffin Land.)

10 to 30 cm. tall; ligule pointed, up to 4 mm. long; blades mostly basal, flat or folded, mostly 2 to 3 mm. wide, one short blade about the middle of the culm; panicle open, pyramidal, 5 to 10 cm. long, the lower branches usually 2, spreading, sometimes reflexed, bearing a few spikelets toward the tip; spikelets 5 to 8 mm. long, 3- or 4-flowered; lemmas densely villous on the keel and marginal nerves and pubescent on the lower part of the intermediate nerves, the base often webbed. ♀ (*P. grayana* Vasey; *P. aperta* Scribn. and Merr., a form with pale, rather lax panicles longer than wide.)—Meadows, mostly above timber line, Arctic regions, south to Nova Scotia, in the Rocky Mountains to Nevada and northern New Mexico and in the Cascades to Oregon; California (Inyo County).

3. *Palústres*.—Perennials without creeping rhizomes; lemmas webbed at base, glabrous, or pubescent on the nerves.

23. *Poa triviális* L. ROUGH BLUEGRASS. (Fig. 137.) Culms erect from a decumbent base, often rather lax,

scabrous below the panicle, 30 to 100 cm. tall; sheaths retrorsely scabrous or scaberulous, at least toward the summit; ligule 4 to 6 mm. long; blades scabrous, 2 to 4 mm. wide; panicle oblong, 6 to 15 mm. long, the lower branches about 5 in a whorl; spikelets usually 2- or 3-flowered, about 3 mm. long; lemma 2.5 to 3 mm. long, glabrous except the slightly pubescent keel, or lateral nerves rarely pubescent, the web at base conspicuous, the nerves prominent. 2 —Moist

wet shady places, Vancouver Island to the coast mountains of Oregon.

25. *Poa alsódes* A. Gray. (Fig. 139.) Culms in lax tufts, 30 to 60 cm. tall; blades thin, lax, 2 to 5 mm. wide; panicle 10 to 20 cm. long, very open, the slender branches in distant whorls of threes to fives, finally widely spreading, naked below, few-flowered; spikelets 2- or 3-flowered, about 5 mm. long; lemmas gradually acute, webbed at base, pubescent on the lower part of the keel, otherwise



FIGURE 137.—*Poa trivialis*. Panicle, $\times 1$; floret, $\times 10$. (Coville, N. Y.)

places, Newfoundland and Ontario to North Carolina, Minnesota, South Dakota, and Colorado; on the Pacific coast from southern Alaska to northern California; on ballast, Louisiana; introduced from Europe. Sometimes used in mixtures for meadows and pastures under the name rough-stalked meadow grass.

24. *Poa márcida* Hitchc. (Fig. 138.) Culms erect, in small tufts, 40 to 100 cm. tall; ligule very short; blades thin, 1 to 3 mm. wide; panicle drooping, narrow, 10 to 18 cm. long, the capillary branches somewhat distant, solitary or in pairs, ascending or appressed; spikelets mostly 2-flowered; glumes about 3 mm. long; lemmas narrowly lanceolate, acuminate, 4 to 5 mm. long, glabrous, long-webbed at base. 2 —Bogs and

glabrous, faintly nerved. 2 —Rich or moist woods, Ontario and Maine to Minnesota, south to Delaware and the mountains of North Carolina and Tennessee.

26. *Poa lánguida* Hitchc. (Fig. 140.) Culms weak, in loose tufts, 30 to 60 or even 100 cm. tall; ligule about 1 mm. long; blades lax, 2 to 4 mm. wide; panicle nodding, 5 to 10 cm. long, the few slender branches mostly in twos or threes, ascending, few-flowered toward the ends; spikelets 2- to 4-flowered, 3 to 4 mm. long; lemmas 2 to 3 mm. long, glabrous except the webbed base, oblong, rather obtuse, at maturity firm. 2 (*P. debilis* Torr., not Thuill.)—Dry or rocky woods, Newfoundland and Quebec to Wisconsin, south to Pennsylvania, Kentucky, and Iowa.



FIGURE 138.—*Poa marcida*. Panicle, $\times 1$; floret, $\times 10$. (Type.)

27. *Poa saltuensis* Fern. and Wieg. (Fig. 141.) Resembling *P. languida*; differing in the thinner, acute, somewhat longer lemmas. 2 —Woodland thickets, Quebec and Newfoundland to Minnesota, south to Connecticut and Virginia.

28. *Poa occidentalis* Vasey. NEW MEXICAN BLUEGRASS. (Fig. 142.) Culms erect, few in a tuft, usually rather stout, scabrous, as much as 1 to 1.5 m. tall; sheaths somewhat keeled, retrorsely scabrous (sometimes faintly so); ligule 2 to 8 mm. long; blades scabrous, 10 to 20 cm. long, 3 to 6 mm. wide; panicle open, 15 to 30 cm. long, the branches in distant whorls of threes to fives, spreading to reflexed, the lower as much as 10 cm. long, spikelet-bearing toward the ends; spikelets 3- to 6-flowered; lemmas 4.5 to 5 mm. long, conspicuously webbed at base, villous on the lower part of the keel and the marginal nerves and sometimes sparingly pubescent on the internerves below. 2 —Open woods and moist banks at medium altitudes, Wyoming to New Mexico.

29. *Poa trácyi* Vasey. (Fig. 143.) Culms erect, 60 to 80 cm. tall; sheaths glabrous, keeled; ligule truncate, about 2 mm. long; blades 3 to 5 mm. wide; panicle narrowly pyram-



FIGURE 139.—*Poa alsodes*. Panicle, $\times 1$; floret, $\times 10$. (Wilson, N. Y.)

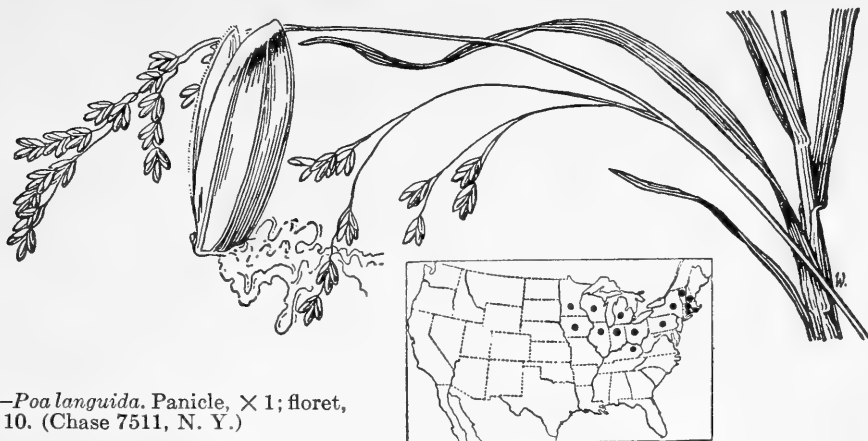
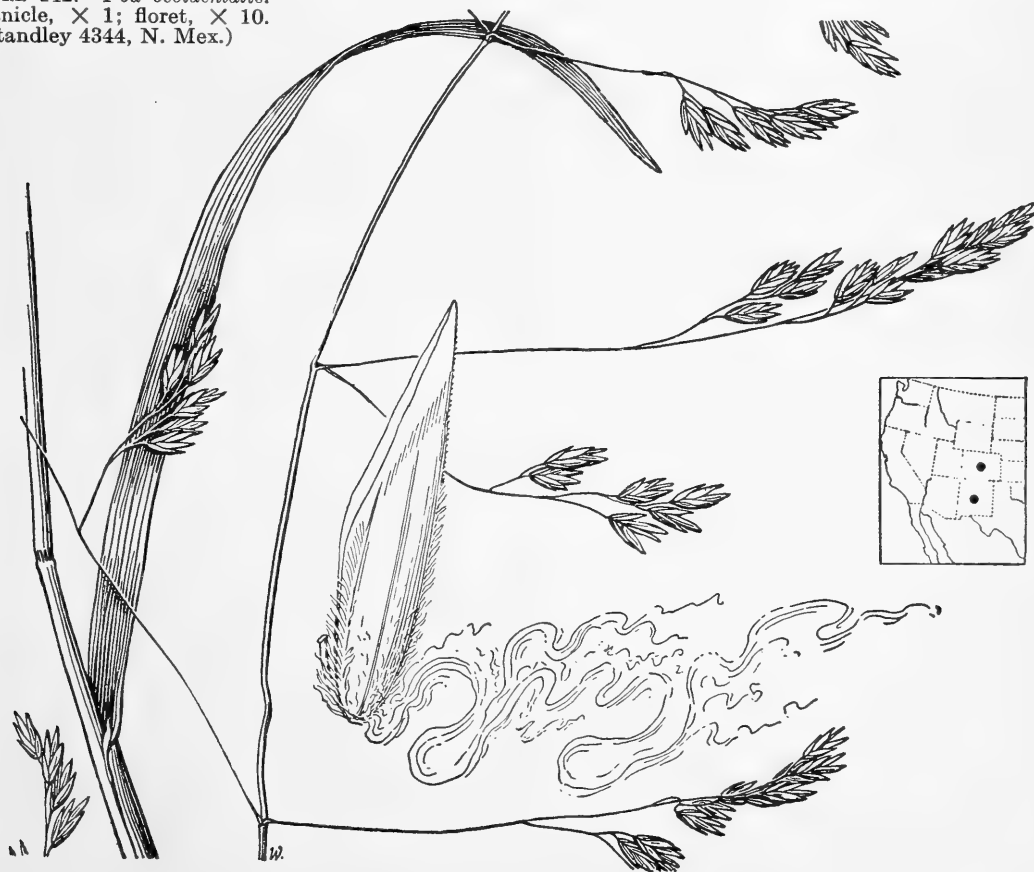


FIGURE 140.—*Poa languida*. Panicle, $\times 1$; floret, $\times 10$. (Chase 7511, N. Y.)



FIGURE 141.—*Poa saltuensis*. Panicle, $\times 1$; floret, $\times 10$. (Fernald and Pease 24875, Quebec.)

FIGURE 142.—*Poa occidentalis*. Panicle, $\times 1$; floret, $\times 10$. (Standley 4344, N. Mex.)



idal, 15 to 20 cm. long, the branches in distant whorls of 2 to 5, spreading, naked on the lower half or two-thirds; spikelets 2- or 3-flowered; lemmas about 3.5 mm. long, oblong-lanceolate or the upper lanceolate, webbed at base, villous on keel and marginal nerves, and more or less so on the internerves below, the intermediate nerves distinct. 2 — Known only from Raton, N. Mex. May be a form of *P. occidentalis*.



FIGURE 143.—*Poa tracyi*. Panicle, $\times 1$; floret, $\times 10$. (Type.)

30. *Poa sylvestris* A. Gray. (Fig. 144.) Culms tufted, erect, 30 to 100 cm. tall; sheaths glabrous or rarely pubescent, the lower usually antrorse-ly scabrous; ligule about 1 mm. long; blades lax, 2 to 6 mm. wide; panicle erect, 10 to 20 cm. long, much longer than wide, the slender flexuous branches spreading, usually 3 to 6 at a node, the lower usually reflexed; spikelets 2- to 4-flowered, 3 to 4 mm. long; lemmas 2.5 to 3 mm. long, webbed at base, pubescent on the keel and marginal nerves and more or less pubescent on the internerves. 2 — Rich, moist, or rocky woods, New York to Wisconsin and Nebraska, south to Florida and Texas.

Sheaths pubescent in a specimen from St. Louis, Mo.

31. *Poa refléxa* Vasey and Scribn. NODDING BLUEGRASS. (Fig. 145.) Culms solitary or in small tufts, erect, 20 to 40 cm. tall; blades rather short, 1 to 4 mm. wide; panicle nodding, 5 to 15 cm. long, the branches naked below, solitary, in pairs or in threes, the lower usually reflexed, sometimes strongly so; spikelets 2- to 4-flowered; lemmas about

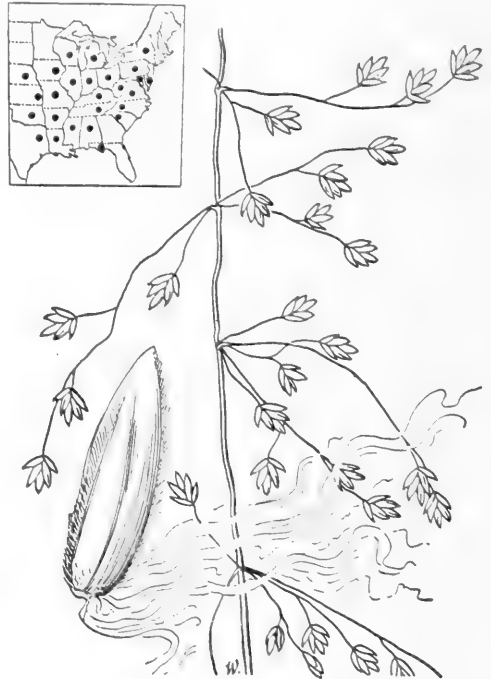


FIGURE 144.—*Poa sylvestris*. Panicle, $\times 1$; floret $\times 10$. (Wheeler 6, Mich.)

3 mm. long, oblong-elliptic, webbed at base, villous on keel and marginal nerves, sometimes on intermediate nerves. 2 — Open slopes and alpine meadows, 2,000 to 4,000 m., Montana to eastern British Columbia, south in the mountains to New Mexico and Arizona.

32. *Poa wölfii* Scribn. (Fig. 146.) Culms tufted, erect, 40 to 80 cm. tall; sheaths slightly scabrous; blades crowded toward the base of the culms, mostly 1 to 2 mm. wide; panicle drooping, 8 to 15 cm. long, the branches ascending, bearing a few spikelets toward the ends, the lower mostly in pairs; spikelets 2- to 4-flowered, 5 to 6 mm. long; lemmas

3.5 to 4.5 mm. long, acute, webbed at base, pubescent on the keel and marginal nerves, the intermediate nerves distinct. 2 —Moist woods, Ohio to Minnesota, Nebraska, and Missouri.

33. *Poa paucispícula* Scribn. and Merr. (Fig. 147.) Culms tufted, leafy, rather lax, 10 to 30 cm. tall, the base often decumbent; blades 1 to 2 mm. wide; panicle lax, few-flowered, 2 to 8 cm. long, the branches in pairs or solitary, naked below; spikelets ovate, purple, 4 to 6 mm. long, 2- to 5-flowered; glumes rather broad, acute, 3 to 4 mm. long; lemmas 3 to 4 mm. long, oblong, obtuse, webbed at base (the web sometimes scant), pubescent on the keel and marginal nerves below. 2 —Rocky slopes, Alaska to Washington (alpine slopes, Mount Rainier, Mount Baker); Glacier National Park, Mont. More leafy than *P. leptocoma*, more tufted, the panicle branches not so long; spikelets broader.

34. *Poa leptocoma* Trin. BOG BLUE-GRASS. (Fig. 148.) Culms slender, solitary, or few in a tuft, 20 to 50 cm. tall, often decumbent at base; sheaths usually slightly scabrous; ligule acute, the uppermost 3 to 4 mm. long; blades short, lax, mostly 2 to 4 mm. wide; panicle nodding, delicate, few-flowered, the branches capillary, ascending or spreading, subflexuous, the lower mostly in pairs; spikelets narrow, 2- to 4-flowered; glumes narrow, acuminate; lemmas 3.5 to 4.5 mm. long, acuminate, webbed at base, pubescent on the keel and marginal nerves or sometimes nearly glabrous, the intermediate nerves distinct. 2 —Bogs, Alaska, south in the mountains to northern New Mexico, Colorado, and California (Mount Dana).

35. *Poa paludígena* Fern. and Wieg. (Fig. 149.) Culms slender, solitary or in small tufts, 15 to 70 cm. tall; sheaths minutely scabrous; ligule short, truncate, the uppermost as much as 1.5 mm. long; blades rather lax, mostly erect, 0.3 to 2 mm.

wide; panicle loose and open, mostly 5 to 10 cm. long, the branches long and slender, distant, the lower mostly in twos, spikelet-bearing above the middle; spikelets mostly 4 to 5 mm. long, narrow, 2- to 5-flowered; lemmas 2.5 to 3.5 mm. long, webbed at base with a few long hairs, the keel

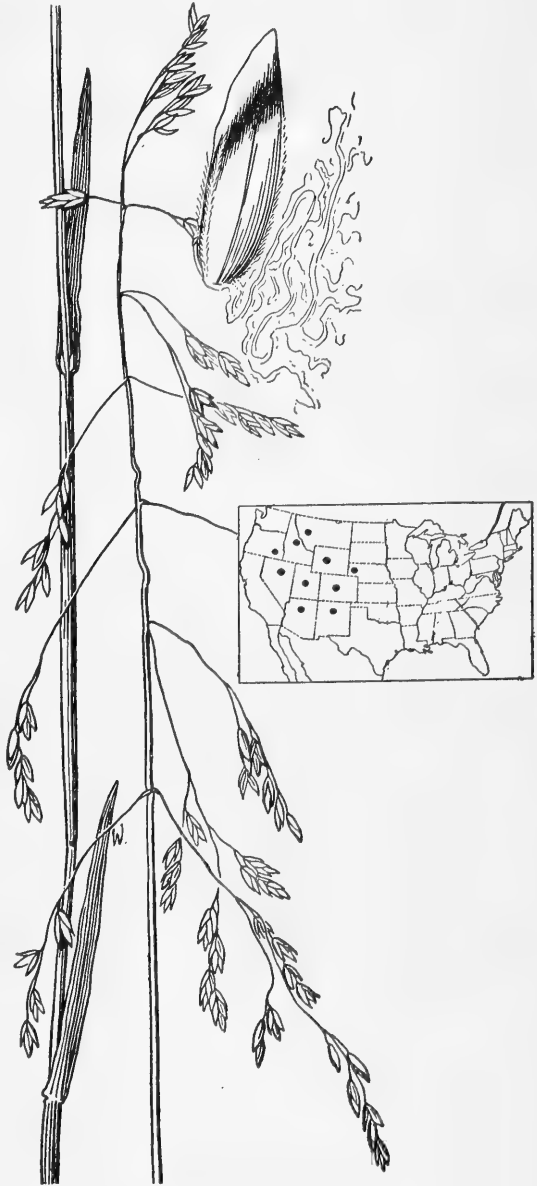


FIGURE 145.—*Poa reflexa*. Panicle, $\times 1$; floret, $\times 10$. (Clokey 11330, Colo.)

and lateral nerves pubescent on the lower half or two-thirds, the intermediate nerves glabrous, obscure. 2 —Bogs and springy places, New York and Pennsylvania to Illinois and Wisconsin.



FIGURE 146.—*Poa wolfei*. Panicle, $\times 1$; floret, $\times 10$. (Deam 33821, Ind.)

36. *Poa bulbósa* L. BULBOUS BLUE-GRASS. (Fig. 150.) Culms densely tufted, more or less bulbous at base, 30 to 60 cm. tall; blades flat or loosely involute, 1 to 2 mm. wide; panicle ovoid, mostly 5 to 8 cm. long, somewhat contracted, the branches ascending or appressed, some floriferous to base; spikelets mostly proliferous, the florets converted into bulblets with a dark purple base (about 2 mm. long), the bracts extending into slender green tips 5 to 15 mm. long; unaltered

spikelets about 5-flowered, apparently not perfecting seed; lemmas 2.5 mm. long, webbed at base, densely silky on the keel and marginal nerves, the intermediate nerves faint. 2l —Fields and meadows, New York to North Carolina; North Dakota to British Columbia and California; Utah; Colorado and Oklahoma; introduced from Europe, propagated by bulblets.

37. *Poa nemoralis* L. WOOD BLUE-GRASS. (Fig. 151.) Culms tufted, 30 to 70 cm. tall; ligule very short;

blades rather lax, about 2 mm. wide; panicle 4 to 10 cm. long, the branches spreading; spikelets 2- to 5-flowered, 3 to 5 mm. long; glumes narrow, sharply acuminate, about as long as the first floret; lemmas 2 to 3 mm. long, sparsely webbed at base, pubescent on the keel and marginal nerves, the intermediate nerves obscure. 2—Labrador to Alaska and British Columbia; occasional in meadows,



FIGURE 147.—*Poa paucispicula*. Panicle, $\times 1$; floret, $\times 10$. (Hitchcock 11711, Wash.)



FIGURE 149.—*Poa paludigena*. Panicle, $\times 1$; floret, $\times 10$. (Eames and Wiegand 9250, N. Y.)



FIGURE 148.—*Poa leptocoma*. Panicle, $\times 1$; floret, $\times 10$. (Arsène and Benedict 15562, N. Mex.)

Maine to Pennsylvania, Michigan, and Minnesota; Wyoming; Washington; Delaware and Virginia; introduced from Europe. Differing from *P. palustris* and *P. interior* in the very short ligule and the narrow acuminate glumes.

38. *Poa macroclada* Rydb. (Fig. 152.) Culms 50 to 80 cm. tall, glabrous; ligule prominent, 2 to 3 mm. long; blades 2 to 3 mm. wide; panicle open, 10 to 20 cm. long, pyramidal, the branches spreading, distant, in twos or threes, as much as 8 cm. long, naked on the lower half or



FIGURE 150.—*Poa bulbosa*, $\times 1$. (Henderson 6136, Idaho.)



FIGURE 151.—*Poa nemoralis*. Panicle, $\times 1$; floret, $\times 10$. (Hitchcock 23662, Newfoundland.)

two-thirds; spikelets about 6 mm. long, 2- or 3-flowered, purple; glumes 3.5 to 4 mm. long; lemmas 4 to 4.5 mm. long, pubescent on the keel and marginal nerves, the web scant or wanting. 24 —Moist places, at medium altitudes, Colorado, Montana, and Idaho. A little-known species, allied to *P. palustris*, but with larger spikelets.

39. *Poa palustris* L. FOWL BLUE-GRASS. (Fig. 153.) Culms loosely tufted, glabrous, decumbent at the

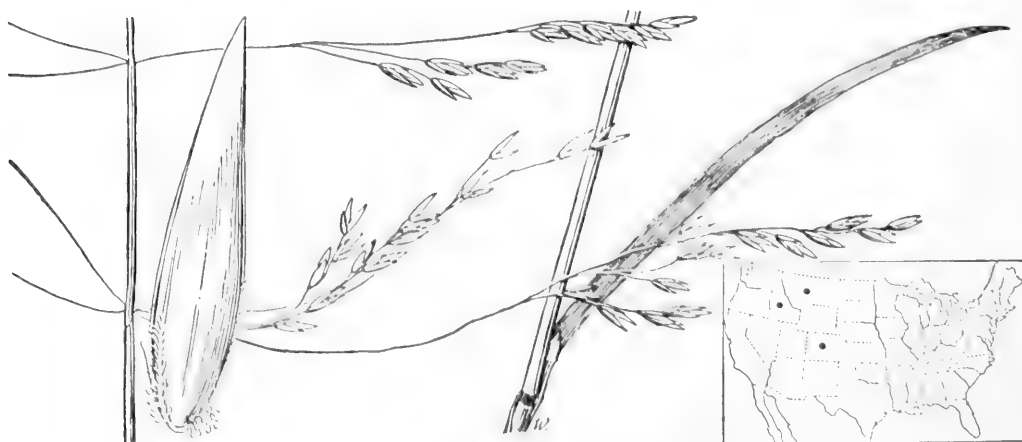


FIGURE 152.—*Poa macroclada*. Panicle, $\times 1$; floret, $\times 10$. (Duplicate type.)

flattened purplish base, 30 to 150 cm. tall; sheaths keeled, sometimes scaberulous; ligule 3 to 5 mm. long, or only 1 mm. on the innovations; blades 1 to 2 mm. wide; panicle pyramidal or oblong, nodding, yellowish green or purplish, 10 to 30 cm. long, the branches in rather distant fascicles, naked below; spikelets 2- to 4-flowered, about 4 mm. long; glumes lanceolate, acute, shorter than the first floret; lemmas 2.5 to 3 mm. long, usually bronzed at the tip, webbed at

ginal nerves, the intermediate nerves faint. 2 —Grassy slopes and open woods at medium altitudes, usually not extending much above timber line, Quebec to British Columbia and Washington, south to Vermont, Michigan, Minnesota, western Nebraska, Texas, and Arizona.

4. Homalopóae.—Culms flattened; blades flat or conduplicate, with a conspicuous boat-shaped tip, often splitting at the apex.

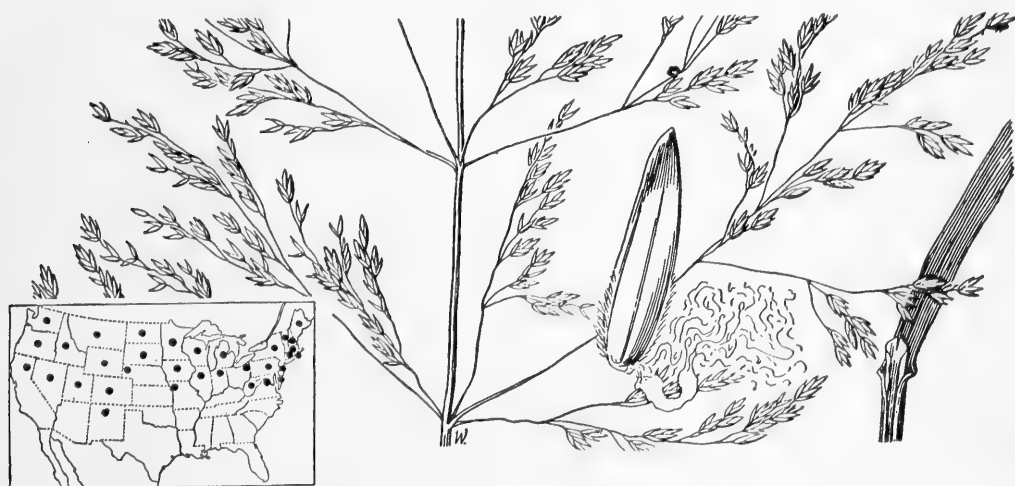


FIGURE 153.—*Poa palustris*. Panicle, $\times 1$; floret, $\times 10$. (Suksdorf 7022, Wash.)

base, villous on the keel and marginal nerves. 2 —Meadows and moist open ground, at low and medium altitudes, Newfoundland and Quebec to Alaska, south to Virginia, Missouri, Nebraska, New Mexico, and California (Sierra Valley, Siskiyou County); Eurasia.

40. Poa interior Rydb. INLAND BLUEGRASS. (Fig. 154.) Culms erect from a usually densely tufted erect base, commonly rather stiff, often scabrous below the panicle, 20 to 50 cm. tall; sheaths slightly keeled or terete; ligule usually less than 1 mm. long; blades 1 to 2 mm. wide; panicle narrowly pyramidal, 5 to 10 cm. long, the branches ascending, the lower 2 or 3 spikelets about 4 mm. long, 2- to 4-flowered; glumes relatively broad, acute to acuminate; lemmas 3 to 3.5 mm. long, webbed at base (the web sometimes scant or obscure), villous on the lower half of the keel and mar-



FIGURE 154.—*Poa interior*. Panicle, $\times 1$; floret, $\times 10$. (Clements 297, Colo.)

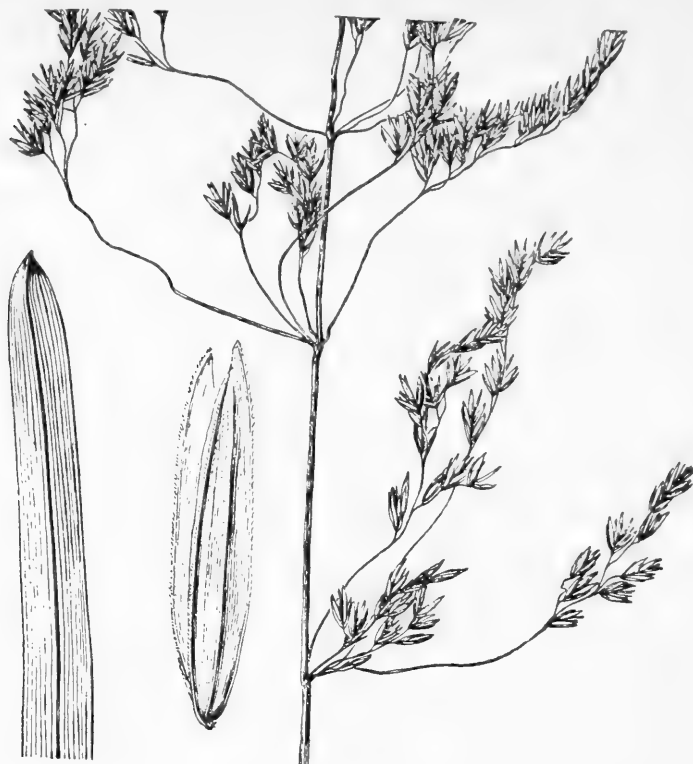


FIGURE 155.—*Poa chaixii*. Panicle, $\times 1$; floret, $\times 10$. (Lakela 2012, Minn.)

41. *Poa chaixii* Vill. (Fig. 155.)

Culms erect or ascending, as much as 1 m. tall, soft, flattened, smooth and shining; sheaths compressed, keeled, glabrous, the lower somewhat crowded; blades mostly 10 to 20 cm. long, 4 to 8 mm. wide, flat or conduplicate, glabrous with scabrous margins; panicles about 15 cm. long, the slender spreading branches in whorls of 5, spikelet-bearing above the middle; spikelets 4 to 6 mm. long, 2- to 4-flowered, short-pedicel; lemmas 3.5 to 4 mm. long, acute, glabrous, or scabrous on the keel, distinctly 5-nerved. 2 —Rich woods, Minnesota (Hunters Hill near Duluth, apparently indigenous); northern Europe.

5. *Alpinae*.—Perennials without creeping rhizomes; lemmas not webbed at base, pubescent on the keel or on the marginal nerves, or both, sometimes also pubescent on internerves.

42. *Poa fendleriána* (Steud.) Vasey. MUTTON GRASS. (Fig. 156.) Incompletely dioecious; culms erect,

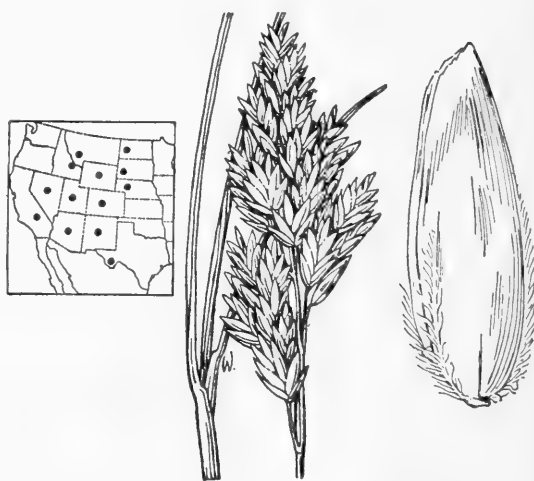


FIGURE 156.—*Poa fendleriána*. Panicle, $\times 1$; floret, $\times 10$. (Eggleston 6463, N. Mex.)

tufted, scabrous below the panicle, 30 to 50 cm. tall; sheaths somewhat scabrous; ligule less than 1 mm. long, not noticeable viewed from the side of the sheath; blades mostly basal, folded or involute, firm and stiff; panicle long-exserted, oblong, contracted, pale, 2 to 7 cm. long; spikelets 4- to 6-flowered, about 8 mm. long; glumes broad, 3 to 4 mm. long; lemmas 4 to 5 mm. long, villous on lower part of

keel and marginal nerves, the intermediate nerves obscure; pistillate spikelets with minute stamens, the anthers about 0.2 mm. long. 2 — Mesas, open dry woods, and rocky hills at medium altitudes, Manitoba to British Columbia, south through western South Dakota (Black Hills), Nebraska, and Idaho to western Texas (Chisos Mountains) and California; northern Mexico. A very small proportion of specimens have been found with well-developed stamens having large anthers, the pistil also developed.

43. *Poa longiligula* Scribn. and Will. LONGTONGUE MUTTON GRASS. (Fig. 157.) Differing from *P. fendleri* in the prominent ligule, as much as 5 to 7 mm. long and in the looser, often longer, usually greenish panicle. 2 — North Dakota to Oregon, south to New Mexico and California.



FIGURE 157.—*Poa longiligula*. Ligule, $\times 1$. (Jones 5149, Utah.)

44. *Poa autumnalis* Muhl. ex Ell. (Fig. 158.) Culms in rather large lax tufts, 30 to 60 cm. tall; blades 2 to 3 mm. wide, numerous at base; panicle 10 to 20 cm. long, about as broad, very open, the capillary flexuous branches spreading, bearing a few spikelets near the ends; spikelets 4- to 6-flowered, about 6 mm. long; lemmas oblong, obtusely rounded at the scarious compressed apex, villous on the keel and marginal nerves, pubescent on the internerves below or sometimes



FIGURE 158.—*Poa autumnalis*. Panicle, $\times 1$; floret, $\times 10$. (Curtiss 6787, Ga.)



FIGURE 159.—*Poa alpina*. Panicle, $\times 1$; floret, $\times 10$. (Eggleston 11824, Colo.)

nearly to apex. 2 —Moist woods, New Jersey to Michigan and Illinois, south to Florida and Texas.

45. *Poa alpina* L. ALPINE BLUE-GRASS. (Fig. 159.) Culms erect from a rather thick vertical crown, rather stout, 10 to 30 cm. tall; blades short, 2 to 5 mm. wide, the uppermost about the middle of the culm; panicle ovoid or short-pyramidal, rather compact, 1 to 8 cm. long, the lower branches often reflexed; spikelets broad, purple or purplish; glumes broad, abruptly acute; lemmas 3 to 4 mm. long, strongly villous on the keel and marginal nerves, pubescent on the internerves below, the intermediate nerves faint. 2 —Mountain meadows, Arctic regions of the Northern Hemisphere, extending south to Quebec, northern Michigan (Keweenaw Point), and the alpine summits of Colorado, Utah, Washington, and Oregon (Wallowa Mountains); Mexico.

46. *Poa stenantha* Trin. (Fig. 160.) Culms tufted, 30 to 50 cm. tall;



FIGURE 160.—*Poa stenantha*. Panicle, $\times 1$; floret, $\times 10$. (Blankinship, Mont.)

ligule prominent, as much as 5 mm. long; blades flat or loosely involute, rather lax, mostly basal, 1 to 2 mm. wide, the uppermost culm leaf below the middle of the culm; panicle nodding, 5 to 15 cm. long, the branches in twos or threes, arcuate-drooping, naked below, with a few spikelets at the ends; spikelets 3- to 5-flowered, 6 to 8 mm. long; lemmas about 5 mm. long, pubescent on the lower part of keel and marginal nerves, sparsely pubescent on the internerves below. 2 —Moist open ground, Alaska, Alberta, and British Columbia, extending into Montana, Colorado (White River Forest), Idaho, Washington (Nooksack River), and Oregon (Crater Lake).



FIGURE 161.—A, *Poa glauca*. Panicle, $\times 1$; floret, $\times 10$. (Hitchcock 16053, N. H.) B, *P. glaucantha*. Panicle, $\times 1$; floret, $\times 10$. (Butters, Abbe, and Abbe 258, Minn.)

47. *Poa glauca* Vahl. (Fig. 161, A.) Plants glaucous, in close or loose tufts; culms compressed, stiff, 10 to 30 cm. tall, sometimes taller, naked above, the uppermost leaf usually much below the middle, its ligule

about 2 mm. long; blades mostly basal, 3 to 5 cm. long, 1 to 2 mm. wide; panicle 3 to 7 cm. long, narrow, sometimes rather compact, the branches erect or ascending, few-flowered; spikelets mostly 2- or 3-flowered, 5 to 6 mm. long; lemmas 3 to 4 mm. long, strongly pubescent on the lower half of the keel and marginal nerves and often slightly pubescent on the faint intermediate nerves.

♂ —Rocky slopes, Arctic regions south to the alpine summits of New Hampshire; Wisconsin; Minnesota; Colorado. Common in Greenland; Eurasia.

48. *Poa glaucantha* Gaudin. (Fig. 161, B.) Plants mostly glaucous, culms compressed, in tufts, usually 30 to 70 cm. tall, leafy throughout; blades to 12 cm. long; panicle 6 to 16 cm. long, loose, but branches mostly ascending; spikelets 5 to 7 mm. long, 3- to 6-flowered; lemmas pubescent on keel and lateral nerves, sometimes with an obscure web at base. ♂ —Mountain meadows, slopes, and cliffs, Newfoundland to Quebec, Minnesota, Montana, and Wyoming; Europe. Resembles both *Poa nemoralis* and *P. interior*, distinguished from both by the florets without web at base or with very obscure web, from *P. nemoralis* by the flat culms, and from *P. interior* by the more strongly keeled sheaths and larger spikelets. A variable and puzzling species, apparently intermediate between *P. nemoralis* and *P. glauca*. *Poa scopu-*

lorum Butters and Abbe is an unusually slender lax form.

49. *Poa fernaldiana* Nannf. (Fig. 162.) Plants in loose lax bunches; culms weak and slender, 10 to 20 or sometimes 30 cm. tall; ligule truncate, about 1 mm. long; blades mostly basal, lax, mostly about 1 mm. wide; panicle narrow but loose, few-flowered, 2 to 6 cm. long, the branches ascending, naked below; spikelets 2- to 4-flowered, about 5 mm. long; lemmas 3 to 3.5 mm. long, densely villous on the lower half of the keel and marginal nerves, sometimes sparsely webbed at base. (Has been confused with *P. laxa* Haenke, a European species.) ♂ —Rocky slopes, Newfoundland and Quebec to the alpine summits of Maine, New Hampshire, Vermont, and New York. Common on the upper cone of Mount Washington.



FIGURE 163.—*Poa pattersoni*. Plant, $\times 1$; floret, $\times 10$. (Patterson 154, Colo.)



FIGURE 162.—*Poa fernaldiana*. Panicle, $\times 1$; floret, $\times 10$. (Fernald, Maine.)

50. *Poa pattersoni* Vasey. PATTERSON BLUEGRASS. (Fig. 163.) Culms loosely tufted with numerous basal leaves, 10 to 20 cm. tall; blades usually folded, rather lax, mostly less than 10 cm. long, about 1 mm. wide; panicle narrow, condensed, purplish,

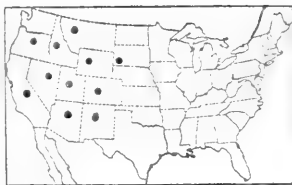


FIGURE 164.—*Poa rupicola*.
Plant, $\times 1$; floret, $\times 10$.
(Swallen 1348, Colo.)

1 to 4 cm. long; spikelets 2- or 3-flowered, 5 to 6 mm. long; lemmas about 4 mm. long, strongly pubescent on the keel and marginal nerves, short-pubescent on the internerves, sometimes sparsely webbed at base. 2

—Alpine regions, Montana to Oregon (Mount Hood), Colorado, and Utah.

51. *Poa rupicola* Nash. TIMBER-LINE BLUEGRASS. (Fig. 164.) Culms densely tufted, erect, rather stiff, often scaberulous below the panicle, 10 to 20 cm. tall; blades short, 1 to 1.5 mm. wide; panicle narrow, purplish, 2 to 4 cm. long, the short branches ascending or appressed; spikelets usually purple, about 3-flowered; lemmas villous below on keel and marginal nerves and some-



FIGURE 165.—*Poa involuta*. Plant, $\times 1$; floret, $\times 10$. (Swallen 1110, Tex.)

times pubescent on the internerves below. 2 —Rocky slopes, British Columbia, south in the mountains, at high altitudes, South Dakota (Black Hills) and Montana to Oregon (Mount Hood and Wallowa Mountains); New Mexico, and California (Mono Pass, Sheep Mountain). Small specimens of *P. interior*, which resemble this, differ in having a small web at the base of the lemma.

6. Épiles.—Perennials without rhizomes; lemmas not webbed at base, glabrous or scabrous (minutely pubescent in *P. unilateralis*).

52. *Poa involúta* Hitchc. (Fig. 165.)

In dense pale tufts; culms slender, 30 to 40 cm. tall; ligule very short; blades involute, slender, 15 to 25 cm. long, glabrous or slightly scabrous; panicle open, 10 to 15 cm. long, the branches in pairs, few-flowered near the ends; spikelets mostly 3- or 4-flowered, 5 to 6 mm. long; lemmas 3 to 4 mm. long, scabrous. 2 —Known only from the Chisos Mountains, Tex.

53. *Poa cusickii* Vasey. CUSICK BLUEGRASS. (Fig. 166.) Culms in

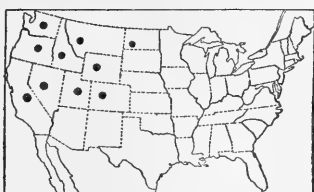


FIGURE 166.—*Poa cusickii*. Panicle, $\times 1$; floret, $\times 10$. (Howell 183, Oreg.)

dense often large tufts, erect, 20 to 60 cm. tall; ligule very short; blades filiform, erect, scabrous, mostly basal; panicle usually pale, tawny, or purple-tinged, narrow, oblong, contracted or somewhat open at anthesis, 3 to 8 cm. long; spikelets 7 to 9 mm. long; lemmas 4.5 to 6 mm. long, smooth or scabrous. 2 —Dry or rocky slopes at medium and high altitudes, Alberta to British Columbia, south to North Dakota, Colorado, and the central Sierras of California. A form with elongate blades and laxer panicle has been differentiated as *P. filifolia* Vasey; Idaho and Washington.



FIGURE 167.—*Poa napensis*. Floret, $\times 10$. (Duplicate type.)

FIGURE 168.—*Poa unilateralis*. Panicle, $\times 1$; floret, $\times 10$. (Chase 5653, Calif.)

54. *Poa napensis* Beetle. (Fig. 167.) Resembling *P. cusickii*; ligule about 1 mm. long, decurrent in young leaves; basal blades filiform, the culm blades 1.5 to 2.5 mm. wide; panicle as in *P. cusickii*, the spikelets slightly smaller; glumes 3 and 3.5 mm. long; lemmas about 4 mm. long, slightly to rather strongly scabrous. 2 —Known only from Myrtledale Hot Springs, Napa County, Calif.

55. *Poa unilateralis* Scribn. (Fig. 168.) Culms in dense tufts, 10 to 40 cm. tall, sometimes decumbent at base; sheaths tawny, papery; blades

flat or folded, shorter than the culms; panicle oblong, dense and spikelike or somewhat interrupted below, 2 to 6 cm. long; spikelets 6 to 8 mm. long; glumes broad, acute; lemmas 3 to 4 mm. long, glabrous except for a few short hairs on the nerves below. ♀ (*P. pachypholis* Piper.)—Cliffs, bluffs, and rocky meadows near the seashore, Washington (Ilwaco), Oregon, and California (Humboldt Bay to Monterey).



FIGURE 169.—*Poa epilys*. Panicle, $\times 1$; floret, $\times 10$. (Type.)

56. *Poa épilis* Scribn. SKYLINE BLUEGRASS. (Fig. 169.) Culms compressed, erect in rather loose to dense tufts, 20 to 40 cm. tall; ligule about 3 mm. long; blades of the culm about 3, flat, 3 to 6 cm. long, 2 to 3 mm. wide, of the innovations narrow, longer and usually folded or involute; panicle usually condensed, ovoid, 2 to 6 cm. long, long-exserted, usually purple, the lower branches naked below, ascending or appressed; spikelets 3-flowered, about 5 mm. long; lemmas 4 to 5 or even 6 mm. long, glabrous or minutely scabrous. ♀ —Mountain meadows, mostly above timber line, Alberta to British Columbia, south to Colorado and California.

57. *Poa vaseyóchloa* Scribn. (Fig. 170.) In small dense soft lax tufts;



FIGURE 170.—*Poa vaseyochloa*. Plant, $\times 1$; floret, $\times 10$. (Type.)

culms erect, 10 to 20 cm. tall; ligule acute, about 3 mm. long; blades lax, mostly folded or involute, in a basal tuft, mostly less than 5 cm. long, with one or two short ones on the culm, narrow or filiform; panicle ovate, 2 to 4 cm. long, few-flowered, open, the slender branches spreading, bearing 1 or 2 spikelets; spikelets purple, 3- to 6-flowered; glumes 2 to 3 mm. long, rather broad; lemmas smooth or minutely scabrous, 3 mm. long. ♀ —Rocky slopes, Cascade Mountains of Washington and Oregon in the vicinity of Columbia River, and the Wallowa Mountains of Oregon.

58. *Poa prínglei* Scribn. (Fig. 171.) Densely tufted; culms 10 to 20 cm. tall; lower sheaths loose, papery; blades mostly basal, involute, mostly 2 to 5 cm. long, sometimes longer, glabrous on the exposed surface, puberulent on inner surface; panicle narrow, condensed, usually pale or silvery, few- to several-flowered, 1 to 5 cm. long; spikelets 3- to 5-flowered, 6 to 8 mm. long; glumes equal, broad, 4 to 5 or rarely 7 mm. long; lemmas 5 to 6, rarely to 8 mm. long, smooth or scabrous. ♀ —Rocky alpine summits, Montana to Washington,

south to Nevada (Mount Rose) and California.



FIGURE 171.—*Poa pringlei*. Plant, $\times 1$; floret, $\times 10$. (Henderson 3080, Idaho.)

59. *Poa lettermani* Vasey. (Fig. 172.) In low lax tufts; culms mostly less than 10 cm. tall, usually scarcely exceeding the blades; ligule 1 to 2 mm. long; blades lax, usually not more than 1 mm. wide; panicle narrow, contracted, 1 to 3 cm. long; spikelets 3- or 4-flowered, 4 to 5 mm. long; glumes equal, somewhat



FIGURE 172.—*Poa lettermani*. Plant, $\times 1$; floret, $\times 10$. (Letterman, Colo.)

acuminate, about as long as the first and second florets; lemmas erose at summit, 2.5 to 3 mm. long. 2 — Rocky alpine summits, British Columbia, Washington, Wyoming, and Colorado to California.

60. *Poa montevansi* Kelso. (Fig. 173.) Similar to *P. lettermani*, the culms (in type specimen) only 4.5 cm. tall, differing chiefly in the spikelets, with scabrous glumes and lemmas, the lemmas more acute and scarcely erose. 2 — Known only from Mount Evans, 14,260 feet altitude, Colo.



FIGURE 173.—*Poa montevansi*. Plant, $\times 1$; spikelet and floret, $\times 10$. (Type.)

61. *Poa leibergii* Scribn. LEIBERG BLUEGRASS. (Fig. 174.) Usually densely tufted; culms 5 to 30 cm. tall, erect; ligule 1 to 2 mm. long; blades

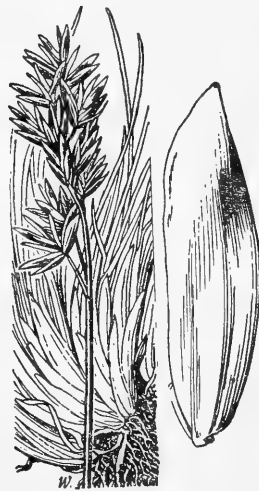


FIGURE 174.—*Poa leibergii*. Plant, $\times 1$; floret, $\times 10$ (Type.)

mostly basal, firm, involute, usually less than 10 cm. long; panicle narrow,

2 to 5 cm. long, often purple, the branches short, appressed or ascending; spikelets 2- to 4-flowered, 4 to 6 mm. long; lemmas 3 to 4 mm. long, smooth or scaberulous. 21 —Alpine meadows and sterile gravelly alpine flats, Idaho, eastern Oregon, and the Sierras of California.

7. Scabr  llae.—Perennials, without rhizomes, tufted, with numerous basal leaves; spikelets little compressed, narrow, much longer than wide; lemmas convex, crisp-puberulent on the back towards the base, the keels obscure, the marginal and intermediate nerves usually faint. The whole group of Scabr  llae is made up of closely related species which appear to intergrade.

62. Poa scabr  lla (Thurb.) Benth. ex Vasey. PINE BLUEGRASS. (Fig. 175.) Culms erect, 50 to 100 cm. tall, usually scabrous, at least below the panicle; sheaths scaberulous; ligule 3 to 5 mm. long; blades mostly basal, 1 to 2 mm. wide, lax, more or less scabrous; panicle narrow, usually contracted, sometimes rather open at base, 5 to 12 cm. long; spikelets 6 to 10 mm. long; glumes 3 mm. long, scabrous; lemmas 4 to 5 mm. long, crisp-puberulent on the back toward base. 21 —Meadows, open woods, rocks, and hills, at low and medium altitudes, western Montana and Colorado to Washington and California; Baja California. A form like *P. scabr  lla* in other respects but with smooth lemmas has been differentiated as *P. limosa* Scribn. and Will.—California (Mono Lake and Truckee).

63. Poa grac  llima Vasey. PACIFIC BLUEGRASS. (Fig. 176.) Culms rather loosely tufted, 30 to 60 cm. tall, usually decumbent at base; ligule 2 to 5 mm. long, shorter on the innovations; blades flat or folded, lax, from filiform to 1.5 mm. wide; panicle pyramidal, loose, rather open, 5 to 10 cm. long, the branches in whorls, the lower in twos to sixes, spreading or sometimes reflexed, naked below;

spikelets 4 to 6 mm. long; second glume 3 to 4 mm. long; lemmas minutely scabrous, crisp-pubescent near base, especially on the nerves. 21 —Cliffs and rocky slopes, Alberta to Alaska, south to Colorado and the southern Sierras of California. *Poa tenerrima* Scribn. is a form with open few-flowered panicles; southern Coast Ranges, California; *P. multinomae* Piper is a loose lax form in which the ligules on the innovations are short and truncate; wet cliffs, Multnomah Falls, Oreg.

64. Poa sec  nda Presl. SANDBERG BLUEGRASS. (Fig. 177.) Culms erect from a dense, often extensive, tuft of short basal foliage, commonly not more than 30 cm., but sometimes up to 60 cm. tall; ligule acute, rather prominent; blades rather short, soft, flat, folded, or involute; panicle narrow, 2 to 10 cm. long, the branches short, appressed, or somewhat spreading in anthesis; spikelets about as in *P. grac  llima*. 21 (*P. sandbergii* Vasey.)—Plains, dry woods, rocky slopes, at medium and upper altitudes, but not strictly alpine, North Dakota to Yukon Territory, south to Nebraska, New Mexico, and southern California; Chile.

65. Poa canbyi (Scribn.) Piper. CANBY BLUEGRASS. (Fig. 178.) Green or glaucous; culms 50 to 120 cm. tall; ligule 2 to 5 mm. long; blades flat or folded; panicle narrow, compact or rather loose, 10 to 15 cm. long, sometimes as much as 20 cm., the branches short, appressed; spikelets 3- to 5-flowered; lemmas more or less crisp-pubescent on lower part of back. 21 (*P. lucida* Vasey; *P. laevigata* Scribn.)—Sandy or dry ground, Michigan (Isle Royale) and Minnesota to Yukon Territory, south to Colorado and eastern Washington to northern California; Quebec. *Poa lucida* has a slender but somewhat loose pale or shining panicle; *P. canbyi* has a denser, compact, dull green panicle, but the two forms grade into each other. *Poa lucida* is



FIGURE 175.—*Poa scabrella*. Plant, $\times \frac{1}{2}$; spikelet, $\times 5$; floret, $\times 10$. (Chase 5697, Calif.)

more common in Colorado and Wyoming; *P. canbyi* more common in Montana. The pubescence on the lemma may be obvious or obscure.



FIGURE 176.—*Poa gracillima*. Plant, $\times 1$; floret, $\times 10$. (Sandberg and Leiberg 747, Wash.)

rather stiff; panicle narrow, 10 to 15 cm. long, pale, rather loose, the branches short-appressed; spikelets 3- to 5-flowered, 6 to 8 mm. long; glumes narrow, the second about as long as the lowest floret; lemmas 4 to 5 mm. long, rather obtuse at the scarious tip. 24 —Low meadows and wet places, Montana to eastern Washington and Yukon Territory, south to Colorado, Arizona, and the Sierras and San Bernardino Mountains, California; on wool waste in Maine (North Berwick).



FIGURE 177.—*Poa secunda*. Plant, $\times 1$; floret, $\times 10$. (Hitchcock 23202, Wyo.)

7. Nevadenses.—Perennials, without rhizomes, tufted; spikelets little compressed, narrow, much longer than wide; lemmas convex on the back, glabrous or minutely scabrous, not crisp-puberulent; keels obscure, marginal and intermediate nerves usually faint.

66. *Poa nevadensis* Vasey ex Scribn. NEVADA BLUEGRASS. (Fig. 179.) Culms erect, 50 to 100 cm. tall; sheaths scabrous, sometimes only slightly so; ligule about 4 mm. long, shorter on the innovations, decurrent; blades usually elongate, narrow, involute, sometimes almost capillary,

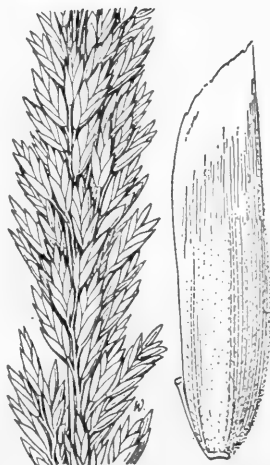


FIGURE 178.—*Poa canbyi*. Panicle, $\times 1$; floret, $\times 10$. (Williams 2787, Wyo.)

67. *Poa curtifolia* Scribn. (Fig. 180.) Culms several in a tuft from firm branched crowns, 10 to 20 cm. tall; ligule prominent, the uppermost as much as 5 mm. long; blades short, the lower 1.5 to 2 cm. long, 2 to 3 mm. wide, the upper successively smaller, the uppermost near the panicle, much reduced; panicle narrow, 3 to 6 cm. long; spikelets about 3-flowered; glumes equal, 5 mm. long, the first acuminate, the second broad, rather



FIGURE 179.—*Poa nevadensis*. Panicle, $\times 1$; floret, $\times 10$. (Parish Bros. 1543, Calif.)

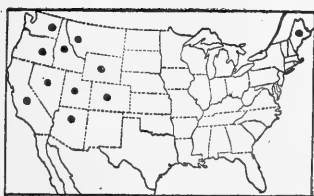
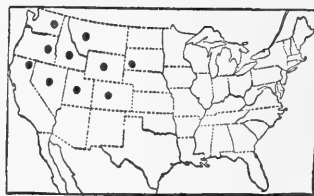


FIGURE 180.—*Poa curtifolia*. Panicle, $\times 1$; floret, $\times 10$. (Duplicate type.)

obtuse; lemmas 5 to 5.5 mm. long. 21 —Known only from central Washington.



FIGURE 181.—*Poa juncifolia*. Panicle, $\times 1$; floret, $\times 10$. (Type.)



68. *Poa juncifolia* Scribn. ALKALI BLUEGRASS. (Fig. 181.) Pale; culms erect, 50 to 100 cm. tall; ligules short, those of the innovations not visible from the sides; blades involute, smooth, rather stiff; panicle narrow, 10 to 20 cm. long, the branches appressed; spikelets 3- to 6-flowered, 7 to 10 mm. long; glumes about equal; lemmas about 4 mm. long. 2 (P. *brachyglossa* Piper.)—Alkaline meadows, Montana to British Columbia, south to South Dakota, Colorado, and east of the Cascades to northeastern California.

69. *Poa ampla* Merr. BIG BLUEGRASS. (Fig. 182.) Green or glaucous; culms 80 to 120 cm. tall; sheaths smooth, rarely scaberulous; ligule short, rounded; blades 1 to 3 mm. wide; panicle narrow, 10 to 15 cm. long, usually rather dense; spikelets 4- to 7-flowered, 8 to 10 mm. long; lemmas 4 to 6 mm. long. 2 — Meadows and moist open ground or dry or rocky slopes, North Dakota to Yukon Territory, south to Nebraska,

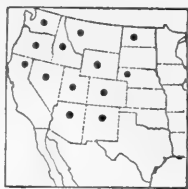
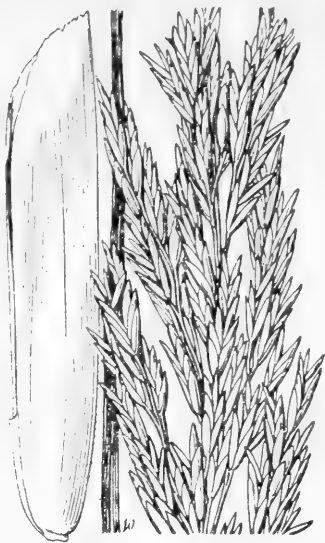


FIGURE 182.—*Poa ampla*. Panicle, $\times 1$; floret, $\times 10$. (Crandall 205, Colo.)

New Mexico, and California. The typical form is robust and more or less glaucous; this grades into a smaller green form, more common in the eastern part of the range (*P. confusa* Rydb.). Occasional specimens of the typical form have short rhizomes.

13. *BRIZA* L. QUAKING GRASS

Spikelets several-flowered, broad, often cordate, the florets crowded and spreading horizontally, the rachilla disarticulating above the glumes and between the florets; glumes about equal, broad, papery-chartaceous, with scarious margins; lemmas papery, broad, with scarious spreading margins, cordate at base, several-nerved, the nerves often obscure, the apex in our species obtuse or acutish; palea much shorter than the lemma. Low annuals or perennials, with erect culms, flat blades, and usually open, showy panicles, the pedicels in our species capillary, allowing the spikelets to vibrate in the wind. Standard species, *Briza media*. Name from Greek, *Briza*, a kind of grain, from *brizein*, to nod.

The three species found in this country are introduced from Europe. They are of no importance agriculturally except insofar as *B. minor* occasionally forms an appreciable part of the spring forage in some parts of California. *B. maxima* is sometimes cultivated for ornament, because of the large showy spikelets.

Panicle drooping; spikelets 10 mm. wide..... 1. *B. MAXIMA*.
Panicle erect; spikelets 4 to 5 mm. wide.

Plants perennial; upper ligule 1 mm. long; spikelets about 5 mm. long.... 3. *B. MEDIA*.

Plants annual; upper ligule 5 mm. or more long; spikelets about 3 mm. long.

2. *B. MINOR*.

1. *Briza máxima* L. BIG QUAKING GRASS. (Fig. 183.) Annual; culms erect or decumbent at base, 30 to 60 cm. tall; panicle drooping, few-flowered; spikelets ovate, 12 mm. long or

more, 10 mm. broad, the pedicels slender, drooping; glumes and lemmas usually purple- or brown-margined. ☉ —Sometimes cultivated for orna-

ment; sparingly escaped in California (Monterey County) and Texas.

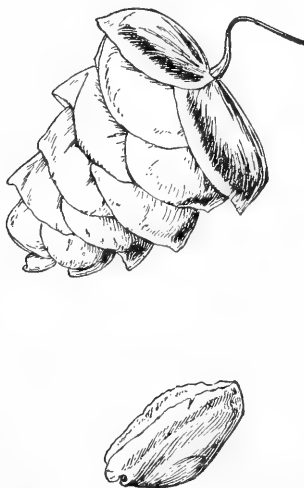
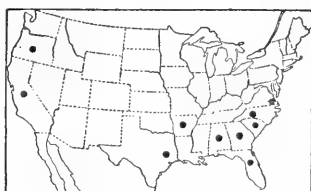
2. *Briza minor* L. LITTLE QUAKING GRASS. (Fig. 184.) Annual; culms erect, 10 to 40 cm. tall; ligule of the upper leaf 5 mm. long or more, acute; blades 2 to 10 mm. wide; panicle 5



FIGURE 183.—*Briza maxima*. $\times \frac{1}{2}$. (Baenitz, Dalmatia.)



FIGURE 184.—*Briza minor*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Hitchcock 2597, Calif.)



to 12 cm. long, the branches stiffly ascending, the spikelets pendent, triangular-ovate, 3- to 6-flowered, about 3 mm. long. ☉ —Introduced at several localities in the Eastern States from Canada to Florida, Arkansas, and Texas, becoming common on the Pacific coast, especially in California.

3. *Briza média* L. (Fig. 185.) Perennial; culms 15 to 60 cm. tall; ligule of the upper leaf about 1 mm. long, truncate; blades 2 to 5 mm. wide; panicle erect, 5 to 10 cm. long, the branches rather stiff, ascending, naked below; spikelets 5- to 12-flowered, orbicular, about 5 mm. long. ☉ —Fields and waste places, sparingly introduced, Ontario to Connecticut and Michigan.

DESMAZÉRIA SICULA (Jacq.) Dum. Low annual; culms spreading with ascending ends; panicles simple, 3 to 5 cm. long, with large flat 2-ranked spikelets. ☉ —Occasionally cultivated for ornament. Europe. (Name sometimes spelled *Demazeria*.)



FIGURE 185.—*Briza média*. Panicle, $\times \frac{1}{2}$. (Oakes, Mass.)

14. ERAGRÓSTIS Beauv. LOVEGRASS

Spikelets few- to many-flowered, the florets usually closely imbricate, the rachilla disarticulating above the glumes and between the florets, or continuous, the lemmas deciduous, the paleas persistent; glumes somewhat unequal, shorter than the first lemma, acute or acuminate, 1-nerved, or the second rarely 3-nerved; lemmas acute or acuminate, keeled or rounded on the back, 3-nerved, the lateral nerves sometimes obscure; palea usually about as long as the lemma, the keels sometimes ciliate. Annuals or perennials of various habit, the inflorescence an open or contracted panicle. Type species, *Eragrostis eragrostis* Beauv. (*E. poaeoides*). Name from the Greek *eros*, love, and *agrostis*, a kind of grass.

Although the species are numerous, they in general appear to have little forage value. *Eragrostis intermedia* is said to furnish forage on the grazing lands of Arizona and New Mexico. Three introduced African species, *E. curvula*, *E. lehmanniana*, and *E. chloromelas*, show promise of being valuable in erosion control in the Southwest.

1a. Plants annual.

2a. Plants creeping, rooting at the nodes, forming mats.

Plants with perfect flowers; anthers 0.2 mm. long..... 11. *E. HYPNOIDES*.

Plants dioecious; anthers 2 mm. long..... 10. *E. REPTANS*.

2b. Plants often decumbent at base but not creeping and forming mats.

3a. Palea prominently ciliate on the keels, the cilia usually as long as the width of the lemma.

Panicle interruptedly spikelike, rarely somewhat open; spikelets usually 3 to 4 mm. long..... 7. *E. CILIARIS*.

Panicle narrow but open, the pedicels ascending or spreading; spikelets 2 mm. long. 8. *E. AMABILIS*.

3b. Palea scabrous to short-ciliate.

4a. Panicle long, narrow, rather dense, tawny or stramineous; spikelets 2 to 3 mm. long..... 9. *E. GLOMERATA*.

- 4b. Panicle more or less open; spikelets usually more than 3 mm. long.
- 5a. Spikelets sessile or nearly so..... 12. *E. SIMPLEX.*
- 5b. Spikelets pediceled.
- 6a. Spikelets mostly less than 5-flowered; lemmas obscurely nerved, scarcely keeled.
- Panicles two-thirds the entire length of the plant or more, diffuse; pedicels more than 5 mm. long; culms erect, closely tufted.... 14. *E. CAPILLARIS.*
- Panicles less than half the entire length of the plant, oblong, open but scarcely diffuse; pedicels mostly less than 5 mm. long; culms spreading or decumbent at base..... 15. *E. FRANKII.*
- 6b. Spikelets mostly more than 5-flowered.
- 7a. Spikelets ovate to oblong, flat, the florets spreading, closely imbricate. 13. *E. UNIOLOIDES.*
- 7b. Spikelets oblong to linear, the florets appressed.
- 8a. Plants with glandular depressions on the panicle branches, the keel of the lemmas, or on margins of blades or keel of sheaths.
- Spikelets 2.5 mm. wide; glands prominent on keel of lemmas. Anthers 0.5 mm. long..... 24. *E. CILIANENSIS.*
- Spikelets not more than 2 mm. wide, mostly less; glandular depressions mostly on panicle branches and leaves.
- Panicle narrow, rather dense..... 23. *E. LUTESCENS.*
- Panicle open, at least one-fourth as wide as long.
- Spikelets 1.5 to 2 mm. wide, dark drab; panicle branches relatively stout and stiff..... 25. *E. POAEOIDES.*
- Spikelets about 1 mm. wide, pale; panicle branches slender, spreading..... 17. *E. PERPLEXA.*
- 8b. Plants not glandular on the branches nor lemmas, sometimes glandular on the sheaths (*E. neomexicana*) and below the nodes (*E. barrelieri*).
- Spikelets about 1 mm. wide, linear, slender.
- Plant delicate; spikelets 3 to 5 mm. long; lemmas 1 to 1.5 mm. long. 16. *E. PILOSA.*
- Plant rather stout; spikelets 5 to 7 mm. long; lemmas about 2 mm. long. 22. *E. ORCUTTIANA.*
- Spikelets 1.5 mm. wide or wider, ovate to linear.
- Panicle narrow, the branches ascending, spikelet-bearing nearly to base, few-flowered; spikelets linear, mostly 10- to 15-flowered. 26. *E. BARRELIERI.*
- Panicle open, often diffuse.
- Spikelets linear, mostly 8- to 15-flowered, on slender spreading pedicels mostly longer than the spikelets..... 29. *E. ARIDA.*
- Spikelets ovate to linear, if linear not on spreading pedicels.
- Spikelets linear at maturity, appressed along the primary panicle branches, these naked at the base for usually 5 to 10 mm. Lower lemmas 1.5 mm. long.
- Primary panicle branches simple or the lower with a branchlet bearing 2 or 3 spikelets; spikelets loosely imbricate or sometimes not overlapping; plants slender, mostly less than 30 cm. tall, the culms slender at base. Chiefly east of the 100th meridian..... 18. *E. PECTINACEA.*
- Primary panicle branches usually bearing appressed branchlets with few to several spikelets, the spikelets thus appearing imbricate or crowded along the primary branches; plants more robust, mostly more than 30 cm. tall, the culms stouter at the base. Chiefly from Texas to southern California..... 19. *E. DIFFUSA.*
- Spikelets ovate to ovate-oblong, rarely linear, if linear not appressed along the primary panicle branches.
- Plants comparatively robust, usually more than 25 cm. tall. Texas to southern California.
- Panicle large, the branches many-flowered, ascending or drooping. Plant as much as 1 m. tall, with blades as much as 1 cm. wide, but often smaller. 27. *E. NEOMEXICANA.*
- Panicle smaller and more open, the spreading branches few-flowered. Plant usually less than 30 cm. tall. 28. *E. MEXICANA.*

Plants delicate, mostly less than 25 cm. tall; blades mostly not more than 2 mm. wide (see also *E. frankii* var. *brevipes*).

Panicle lax, the branches usually naked at base; spikelets 4 to 7 mm. long..... 20. *E. TEPHROSANTHOS*.

Panicle rather stiff, the branches often floriferous nearly to the base; spikelets mostly not more than 3 mm. long.

21. *E. MULTICAULIS*.

1b. Plants perennial.

9a. Panicle elongate, slender, dense, spikelike..... 6. *E. SPICATA*.

9b. Panicle open or contracted, not spikelike.

10a. Plants with stout scaly rhizomes..... 1. *E. OBTUSIFLORA*.

10b. Plants without rhizomes.

11a. Spikelets subsessile or nearly so, the lateral pedicels not more than 1 mm. long. Spikelets subsessile, distant along the few stout panicle branches.

2. *E. SESSILISPICA*.

Spikelets short-pedicel.

Panicle large, becoming a tumbleweed, the axis and branches viscid.

3. *E. CURTIPEDICELLATA*.

Panicle narrow (sometimes open in *E. oxylepis*), not a tumbleweed nor viscid; keels of palea forming a thick white band; grain 1 to 1.2 mm. long.

Lemmas 3 mm. long, somewhat abruptly narrowed to the acute apex; panicle usually red brown; anthers 0.2 to 0.3 mm. long..... 4. *E. OXYLEPIS*.

Lemmas 3.5 mm. long, tapering to the acuminate apex; panicle pale or slightly pinkish; anthers 0.4 to 0.5 mm. long..... 5. *E. BEYRICHII*.

11b. Spikelets with pedicels more than 1 mm. long (appressed along the branches in *E. refracta*; sometimes scarcely more than 1 mm. long in *E. chariis* and *E. bahiensis*). Panicles large and open (sometimes condensed in *E. bahiensis*).

12a. Nerves of lemma obscure; lemma rounded on back, sometimes slightly keeled toward apex.

Axils of main panicle branches usually strongly pilose (rarely glabrous in *E. intermedia*).

Sheaths pilose or hirsute (sometimes glabrous in *E. hirsuta*).

Culms mostly more than 50 cm. tall; blades elongate, flat, not crowded at base of culm..... 30. *E. HIRSUTA*.

Culms mostly less than 50 cm. tall; blades rather short and crowded at base of culm..... 32. *E. TRICHOCOLEA*.

Sheaths glabrous or nearly so, except the pilose summit.

Spikelets about 1 mm. wide, 3- to 7-flowered, 3 to 5 mm. long; lemmas 1.3 to 1.5 mm. long..... 31. *E. LUGENS*.

Spikelets about 1.5 mm. wide; 3- to 8-flowered, 3 to 10 mm. long; lemmas 1.8 to 2 mm. long..... 35. *E. INTERMEDIA*.

Axils of main panicle branches glabrous or the lower sparsely pilose.

Pedicels bearing above the middle a glandular band or spot; axils glabrous. 36. *E. SWALLONI*.

Pedicels without glandular band; lower axils sparsely pilose to glabrous.

Lemmas about 3 mm. long..... 33. *E. EROSA*.

Lemmas about 2 mm. long..... 34. *E. PALMERI*.

12b. Nerves of lemma evident, usually prominent; lemmas keeled.

Spikelets approximate in a somewhat condensed panicle, or along the main branches of a somewhat spreading panicle; florets mostly 15 to 30.

Panicle branches distant, glabrous or nearly so in the axils.

Paleas readily deciduous..... 45. *E. CHARIIS*.

Paleas persistent..... 46. *E. BAHIENSIS*.

Panicle branches approximate, villous in the axils. Culms densely cespitose with arcuate blades attenuate to long filiform flexuous tips.

47. *E. CURVULA*.

Spikelets in an open panicle.

Panicle longer than broad, the branches not horizontally spreading.

Culms not more than 60 cm. tall.

Spikelets 9- to 15-flowered; panicle less than one-third the entire length of culm, the branches not viscid..... 37. *E. TRACYI*.

Spikelets 4- to 8-flowered; panicle more than half the entire length of culm, the branches viscid..... 38. *E. SILVEANA*.

Culms usually 1 m. or more tall.

Spikelets mostly not more than 6-flowered, purplish.

39. *E. TRICHODES*.

Spikelets mostly 8- to 15-flowered, stramineous to bronze.

40. *E. PILIFERA*.

Panicle at maturity about as broad as long.

Panicle purple, the branches slender but rigid..... 41. *E. SPECTABILIS*.

Panicle green to leaden, the branches capillary, fragile.

Spikelets appressed and distant along the nearly simple panicle branches.

44. *E. REFRACTA*.

Spikelets on long pedicels.

Lemmas 2 mm. long..... 42. *E. ELLIOTTII*.

Lemmas 3 mm. long..... 43. *E. ACUTA*.



FIGURE 186.—*Eragrostis obtusiflora*. Plant, $\times \frac{1}{2}$, two views of floret, $\times 10$. (Toumey, Ariz.)

SECTION 1. CATACLÁSTOS Doell

Rachilla of spikelets disarticulating between the florets at maturity.

1. *Eragrostis obtusiflora* (Fourn.) Scribn. (Fig. 186.) Culms erect or ascending, firm, wiry, 30 to 50 cm. tall, from stout creeping rhizomes with closely imbricate hard spiny-pointed scales; sheaths pubescent or pilose at

the throat; blades firm, glaucous, flat, becoming involute at least toward the spiny-pointed tip, 5 to 10 cm. long, 2 to 3 mm. wide at base; panicle 5 to 15 cm. long, the rigid simple branches ascending, loosely flowered, 5 to 8 cm. long; spikelets pale or purplish, 6- to 12-flowered, 8 to 12 mm. long, the pedicels about 1 mm. long; glumes acute, 3 and 5 mm. long; lem-

mas rounded on the back, rather loosely imbricate, obtuse, somewhat lacerate, about 4 mm. long. 2 — Alkali soil, Arizona, New Mexico (Las Playas); Mexico. "This species is one of the most abundant grasses in the extreme alkaline portions of Sulphur Springs Valley, Arizona, where the large rootstocks in many places bind the shifting sands. It rarely flowers, and its superficial appearance, without flowers, is much

the throat; blades flat to rather loosely involute, 1 to 2 mm. wide; panicle loose, open, pilose in the axils, at first about half the entire length of the culm, elongating toward maturity, the axis curving or loosely spiral, as much as 40 cm. long, the distant branches stiffly spreading, 5 to 15 cm. long, floriferous to base, sometimes bearing below a few secondary branches, the whole panicle finally breaking away and tumbling



FIGURE 187.—*Eragrostis sessilispica*. Panicle, $\times 1$; floret, $\times 10$. (Swallen 1791, Tex.)

the same as our common salt grass (*Distichlis spicata*). It is a hard, rigid grass, but furnishes a large part of the forage of Sulphur Springs Valley, when other grasses are eaten off or are cut short by drought."—Toumey in letter.

2. *Eragrostis sessilispica* Buckl. (Fig. 187.) Perennial; culms tufted, erect, 20 to 40 cm. tall, with 1 node above the basal cluster of leaves; sheaths glabrous, strongly pilose at

before the wind; spikelets distant, nearly sessile, appressed, linear, 5- to 12-flowered, 8 to 12 mm. long; glumes acute, about 3 mm. long; lemmas loosely imbricate, acuminate, becoming somewhat indurate, 3 to 3.5 mm. long, the lateral nerves prominent; palea prominently bowed out below.

2 (*Acamptoclados sessilispica* Nash.)—Plains and sandy prairies, Kansas to Texas, New Mexico, and northern Mexico.

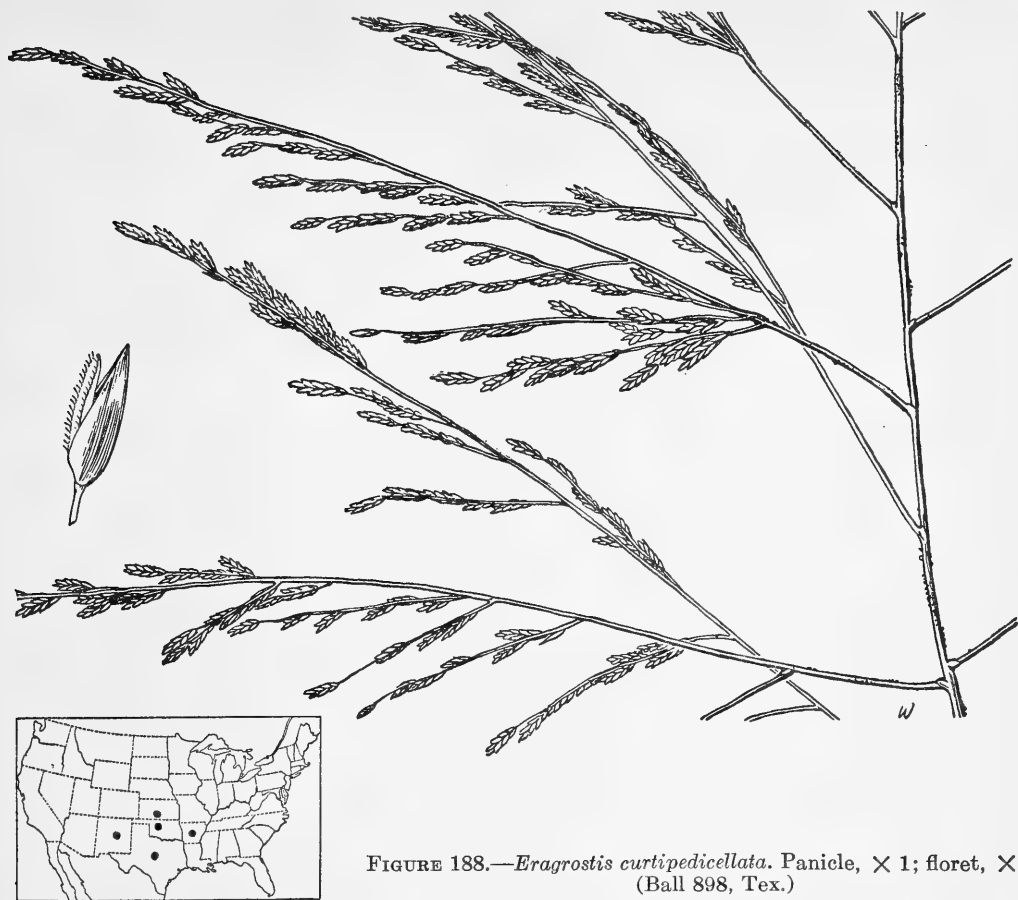


FIGURE 188.—*Eragrostis curtipedicellata*. Panicle, $\times 1$; floret, $\times 10$. (Ball 898, Tex.)

3. *Eragrostis curtipedicellata*

Buckl. (Fig. 188.) Perennial; culms tufted, erect, 20 to 40 cm. tall; sheaths pilose at the throat; blades flat or loosely involute, 1 to 3 mm. wide; panicle open, spreading, at first 15 to 20 cm. long, the axis and branches viscid, rather sparingly pilose in the axils, finally elongating, breaking away and tumbling before the wind, the branches stiffly ascending or spreading; spikelets oblong or linear, short-pediceled, somewhat appressed on the primary and secondary branches, 6- to 12-flowered, 3 to 6 mm. long; glumes about 1.5 mm. long; lemmas rather closely imbricate, oblong, acute, about 1.5 mm. long; palea ciliate on the keels, not bowed out; grain 0.7 mm. long. 2 — Plains, open woods, and dry slopes, Colorado and Kansas to Arkansas, Texas, and New Mexico.

4. *Eragrostis oxylépis* (Torr.)

Torr. (Fig. 189.) Perennial; culms tufted, suberect, 20 to 70 cm. tall;



FIGURE 189.—*Eragrostis oxylepis*. Panicle, $\times 1$; floret, $\times 10$. (Reverchon 3501A, Tex.)

sheaths long-pilose at the throat, the foliage otherwise glabrous, the blades flat, more or less involute in drying, 1 to 4, rarely to 5, mm. wide, tapering to a fine point; panicle 5 to 25 cm. long (mostly 10 to 15 cm.) of several to numerous stiff, ascending or spreading densely flowered branches, approximate to distant, the spikelets mostly aggregate on very short branchlets; spikelets usually red brown, strongly compressed, subsessile, linear at maturity, mostly 10- to 40-flowered, 8 to 15 mm. long; lemmas closely imbricate, 3 mm. long, abruptly narrowed to an acute apex, the tip slightly spreading; palea bowed out below, the keels prominent; anthers 0.2 to 0.3 mm. long; grain 1 to 1.2 mm. long. ♀ — Sandy soil, northern Florida to Colorado, New Mexico, and California (San Diego); eastern Mexico to Vera Cruz. Has been confused with *E. secundiflora* Presl, a rather rare species of Mexico, which it closely resembles, but the latter has less strongly compressed spikelets and grains only 0.4 to 0.5 mm. long.

5. *Eragrostis beyrichii* J. G. Smith. (Fig. 190.) Resembling *E. oxylepis* and possibly only a variety of that species; differing in the softer foliage and panicle, the plant on the average smaller, the panicle mostly smaller, pale or slightly pinkish; spikelets slightly larger; lemmas 3.5 to 4 mm. long (the lower shorter), less firm, tapering to an acuminate apex; palea broader, less bowed out; anthers 0.4 to 0.5 mm. long, yellowish, grain 1 mm. long. ♀ — Sandy soil, Texas and Oklahoma (Wichita Mountains); Mexico.

6. *Eragrostis spicata* Vasey. (Fig. 191.) Perennial; culms tufted, erect, about 1 m. tall; blades flat, elongate, more or less involute in drying, tapering to a slender point; panicle pale, slender, dense, spikelike, 10 to 30 cm. long, 3 to 4 mm. thick; spikelets strongly compressed, 2- or 3-flowered, 2 mm. long, the somewhat pubescent pedicels less than 1 mm. long; glumes

rather broad, obtuse, unequal, the second about 1 mm. long; lemmas about 2 mm. long, all rising to about the same height, the lateral pair of nerves faint. ♀ — Dry ground, Laredo and Brownsville, Tex.; Baja California; Paraguay, Argentina.



FIGURE 190.—*Eragrostis beyrichii*. Panicle, $\times 1$; floret, $\times 10$. (Tracy 7924, Tex.)



FIGURE 191.—*Eragrostis spicata*. Panicle, $\times 1$; spikelet, $\times 10$. (Swallen 1086, Tex.)

7. *Eragrostis ciliaris* (L.) R. Br. (Fig. 192.) Annual; culms branching, erect to spreading, slender, wiry, 15 to 30 cm. tall; blades flat to sub-involute, mostly less than 10 cm. long, 1 to 3 mm. wide; panicle often purplish, condensed, interruptedly spikelike, 3 to 10 cm. long, sometimes looser with stiffly ascending short branches; spikelets 6- to 12-flowered, 2 to 4 mm. long; glumes about 1 mm. long; lemmas oblong, 1 to 1.5 mm. long, obtuse, the midnerve slightly excurrent; keels of the palea conspicuously stiffly long-ciliate, the hairs 0.5 to 0.7 mm. long; grain 0.5 mm. long. ☉ — Sandy shores, rocky soil, and open ground, South



FIGURE 192.—*Eragrostis ciliaris*. Plant, $\times \frac{1}{2}$; spikelet, $\times 5$; floret, $\times 10$. (Nash 2104, Fla.)

Carolina to Florida and Mississippi; Texas; New Jersey (ballast); West Indies and Mexico to Brazil and Peru; Africa; Asia. Specimens with laxer panicles of more spreading loosely flowered branches have been differentiated as *E. ciliaris* var. *laxa* Kuntze.

8. *Eragrostis amabilis* (L.) Wight and Arn. ex Nees. (Fig. 193.) Annual, resembling *E. ciliaris*; blades as

much as 5 mm. wide; panicle oblong or oblong-lanceolate, 2 to 4 cm. wide, rather open; spikelets 4- to 8-flowered, about 2 mm. long; glumes less than 1 mm. long; lemmas ovate, obtuse, 1 mm. long; keels of palea long-ciliate, the hairs about 0.3 mm. long. ☉ (*E. plumosa* Link.)—Gardens and waste places, Georgia and Florida; Texas; tropical America; apparently introduced from the Old World.

9. *Eragrostis glomerata* (Walt.) L. H. Dewey. (Fig. 194.) Annual; culms erect, 20 to 100 cm. tall, branching below, the branches erect; blades flat, 3 to 8 mm. wide, tapering to a fine point; panicle narrow, erect, densely flowered, somewhat interrupted, 5 to 50 cm. long, greenish or tawny, the branches ascending or appressed, floriferous to base, many-flowered; spikelets short-pedicelated, mostly 6- to 8-flowered, 2 to 3 mm. long; glumes minute; lemmas very thin, about 1 mm. long; grain about



FIGURE 193.—*Eragrostis amabilis*. Panicle, $\times \frac{1}{2}$; spikelet, $\times 10$. (Meislahn 10, Fla.)

0.3 to 0.4 mm. long. \odot (*E. conferta* Trin.)—Banks of ponds and streams, and low ground, South Carolina to Florida, Missouri, and eastern Texas, south through Mexico and the West Indies to Uruguay.

SECTION 2. PTEROËSSA Doell

Rachilla of spikelet continuous, not disarticulating at maturity; palea usually persistent for a short time after the fall of the lemma (sometimes falling with it in *E. unioides* and *E. chariis*).

10. *Eragrostis réptans* (Michx.) Nees. (Fig. 195.) Annual, dioecious; culms branching, creeping, rooting at the nodes, forming mats; blades flat, usually pubescent, mostly 1 to 3 cm. long; panicles numerous, ovoid, usually rather dense or capitate, few- to



FIGURE 194.—*Eragrostis glomerata*. Panicle, $\times \frac{1}{2}$; spikelet and floret, $\times 10$. (Eggert, Ark.)

several-flowered, rarely many-flowered, mostly 1 to 2 cm. long; spikelets several- to many-flowered, linear, at length elongate and more or less curved; lemmas closely imbricate, often sparsely villous, acuminate, about 3 mm. long; palea of pistillate floret about half as long as the lemma,



FIGURE 195.—*Eragrostis reptans*. Pistillate (♀) and staminate (♂) plants, $\times \frac{1}{2}$; floret, $\times 10$. (Bush 1306 (♀) and 1307 (♂), Tex.)



FIGURE 196.—*Eragrostis hypnoides*. Plant, $\times \frac{1}{2}$; floret, $\times 10$. (Mearns 741, Minn.)



FIGURE 197.—*Eragrostis simplex*. Panicle, $\times \frac{1}{2}$; floret, $\times 10$. (Curtiss, Fla.)



FIGURE 198.—*Eragrostis uniolooides*. Spikelet, $\times 10$. (Curtiss 6898, Fla.)

of the staminate floret as long as the lemma; grain ovoid, about 0.5 mm. long; anthers before dehiscing, 1.5 to 2 mm. long. ☉ (*E. capitata* Nash.)—River banks, sandy land, and open ground, Kentucky to South Dakota and Texas; Florida.

11. *Eragrostis hypnoïdes* (Lam.) B. S. P. (Fig. 196.) Annual, branching, creeping, and matlike as in the preceding; blades scabrous or pubescent on the upper surface; panicles elliptic, loosely few-flowered, 1 to 5 cm. long, sometimes somewhat capitate; spikelets several- to many-flowered, linear, mostly 5 to 10 mm. long, sometimes as much as 2 cm. long in a dense cluster; flowers perfect; lemmas glabrous, acute, 1.5 to 2 mm. long; palea about half as long as the lemma; grain 0.5 mm. long; anthers about 0.2 mm. long. ☉ —Sandy river banks and wet ground, Quebec to Washington, south through Mexico and the West Indies to Argentina; not found in the Rocky Mountains.

12. *Eragrostis simplex* Scribn. (Fig. 197.) Annual; culms spreading to suberect, 10 to 30 cm. tall; blades flat, 1 to 3 mm. wide; panicle narrow, 5 to 20 cm. long, the main axis often curved, the branches solitary, distant, ascending or spreading, sometimes reflexed, floriferous to base, short, with a few crowded spikelets or as much as 5 cm. long, with short branchlets; spikelets nearly sessile, linear, mostly 20- to 50-flowered, 5 to 20 mm. long; lemmas closely imbricate, ovate, acute, 1.5 to 2 mm. long, the lateral nerves near the margin; grain about 0.5 mm. long, anthers about 0.1 mm. long. ☉ —Sandy woods, dooryards, and waste places, southern Georgia, Florida, and Alabama.

13. *Eragrostis unioloïdes* (Retz.) Nees. (Fig. 198.) Annual; culms erect or ascending, 20 to 40 cm. tall; blades flat, 2 to 4 mm. wide; panicle elliptic, open, 10 to 15 cm. long, about half as wide, the branches ascending;

spikelets ovate-oblong, strongly compressed, truncate at base, obtuse, 15- to 30-flowered, 5 to 10 mm. long, 3 mm. wide, often pink or purplish; lemmas closely imbricate, nearly horizontally spreading, strongly keeled, acute, 2 mm. long, the lateral nerves prominent; palea falling with the lemma or soon thereafter; grain about 0.7 mm. long. ☉ —Waste ground, Georgia and Florida; introduced from southern Asia.

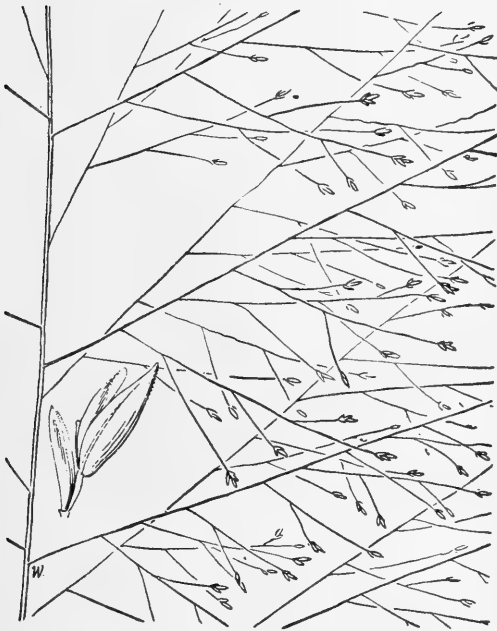
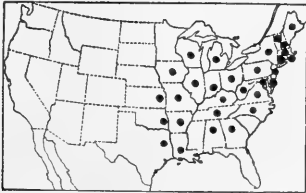


FIGURE 199.—*Eragrostis capillaris*. Panicle, × 1; floret, × 10. (Dewey 35, D. C.)

14. *Eragrostis capillaris* (L.) Nees. LACEGRASS. (Fig. 199.) Annual; culms erect, 20 to 50 cm. tall, much-branched at base, the branches erect; sheaths pilose, at least on the margin, long-pilose at the throat; blades flat, erect, pilose on upper surface near the base, 1 to 3 mm. wide; panicle oblong or elliptic, open, diffuse, usually two-thirds the entire height of the plant, the branches and branchlets capillary; spikelets long-pedicelated, 2- to 4-flowered, 2 to 3 mm. long;

glumes acute, 1 mm. long; lemmas acute, about 1.5 mm. long, obscurely nerved, rounded on the back, minutely scabrous toward the tip; grain 0.5 mm. long, somewhat roughened. ☉ —Dry open ground, open woods, and fields, Maine to Wisconsin, south to Georgia, Kansas, and eastern Texas.

15. *Eragrostis frankii* C. A. Meyer. (Fig. 200.) Resembling *E. capillaris*; culms usually lower, spreading to erect; sheaths glabrous except the pilose throat; blades glabrous; panicle less than half the entire height of the plant, open but not diffuse, mostly less than half as wide as long, the branches ascending, the shorter pedicels not much longer than the spike-



FIGURE 200.—*Eragrostis frankii*. Panicle, × 1; floret, × 10. (Chase 2005, Ill.)

lets; spikelets 3- to 5-flowered, 2 to 3 mm. long. ☉ —Sandbars, river banks, and moist open ground, New Hampshire to Minnesota, south to Florida and Oklahoma. *ERAGROSTIS FRANKII* var. *BRÉVIPES* Fassett. Spikelets 5- to 7-flowered, 3 to 4 mm. long. ☉ —Wisconsin (Glenhaven) and Illinois.

16. *Eragrostis pilosa* (L.) Beauv. INDIA LOVEGRASS. (Fig. 201.) Weedy annual; culms slender, erect or ascending from a decumbent base, 10 to 50 cm. tall; blades flat, 1 to 3 mm. wide; panicle delicate, open, becoming somewhat diffuse, 5 to 20 cm. long, the branches capillary, flexuous, ascending or spreading, finally somewhat implicate, the lower fas-

cicled, sparsely long-pilose in the axils; spikelets gray to nearly black, linear, scarcely compressed, 3- to 9-flowered, 3 to 5 mm. long, about 1 mm. wide, the pedicels spreading, mostly longer than the spikelets; glumes acute, the first a little less than, the second a little more than, 1 mm. long; lemmas loosely imbricate, the rachilla more or less exposed, rounded on the back, acute, 1.2 to 1.5 mm. long, 0.5 mm. wide from keel to margin, the nerves obscure; grain 0.6 mm. long. ☉ —Moist open ground and waste places, Maine to Colorado, south to Florida and Texas, south through Mexico and the West Indies to Argentina; California; introduced from Europe.

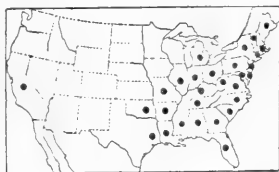


FIGURE 201.—*Eragrostis pilosa*. Panicle, $\times 1$; floret, and palea, $\times 10$. (Ruth 514, Tex.)

17. *Eragrostis perpléxa* L. H. Harvey. (Fig. 202.) Annual resembling *E. pilosa*, but mostly less slender; 20 to 50 cm. tall, or in dry ground 12 to 15 cm. tall; blades mostly 3 to 4 mm. wide; panicle less delicate than in *E. pilosa* and without hairs in the axils; culms below the nodes, keels of the sheaths, and panicle branches bearing small glandular depressions, these often obscure in immature plants. ☉ —Low alkaline areas and buffalo wallows, North Dakota to Kansas; Texas; Colorado.

***Eragrostis viréscens* Presl.** Annual; culms slender, 50 to 60 cm. tall; blades 3 to 6 mm. wide; panicle open, about one third the entire height of the culm, the lower branches mostly solitary, the axils glabrous or nearly so; branchlets and spikelets somewhat appressed along the primary branches; spikelets linear, mostly 7- to 9-flowered, 4 to 5 mm. long, pale or greenish, about 1 mm. wide; lower lemmas scarcely 1.5 mm. long. ☉ Adventive, Maryland; ballast, Apalachicola, Fla.; Chile. Resembling *E. diffusa*; spikelets smaller.



FIGURE 202.—*Eragrostis perplexa*. Sheath, $\times 2$; panicle, $\times 1$. (Type.)

18. *Eragrostis pectinácea* (Michx.) Nees. (Fig. 203.) Resembling *E. pilosa*; panicles less delicate, the axils glabrous or obscurely pilose, the somewhat larger spikelets appressed along the branches and branchlets, often longer than the pedicels; spikelets at maturity mostly linear, 5 to 8 mm. long; lemmas 1.5 to 1.6 mm. long, the rachilla not or scarcely ex-



FIGURE 203.—*Eragrostis pectinacea*. Panicle, $\times 1$; floret, $\times 10$. (V. H. Chase 84, Ill.)

lets, the main panicle branches thus more densely flowered. ☉ —A common weed in fields and open ground, Wyoming, Idaho, Oklahoma, and Texas to Nevada and southern California; introduced occasionally in the Eastern States; Mexico. In some specimens the spikelets are ascending rather than appressed, thus making the panicle more open.

20. *Eragrostis tephrosanthos* Schult. (Fig. 205.) Annual, rather soft and lax; culms branching at base, erect to decumbent-spreading, 5 to 20 cm. tall, sometimes taller; blades flat, usually 5 to 10 cm. long, 1 to 2 mm. wide; panicle open, mostly 4 to 10 cm. long, about half as wide, the branches ascending or spreading, naked below, the spikelets appressed or ascending along the upper part, the lower axils pilose; spikelets 6- to 12-flowered, 4 to 7 mm. long, about 1.5 mm. wide; glumes about 1 and 1.3 mm. long; lemmas 1.5 to 2 mm. long, the lateral nerves distinct. ☉ —



FIGURE 204.—*Eragrostis diffusa*. Panicle, $\times 1$; floret, $\times 10$. (Reverchon 1614, Tex.)

posed, the nerves evident; grain 0.8 mm. long. ☉ (*E. caroliniana* (Spreng.) Scribn.; *E. purshii* Schrad.) —Fields, waste places, open ground, moist places, Maine to Washington, south to Florida and Arizona, rare in the Western States. The name *E. pectinacea* has been misapplied to *E. spectabilis*.

19. *Eragrostis diffusa* Buckl. (Fig. 204.) More robust than *E. pectinacea*, usually 30 to 50 cm. tall, sometimes taller; panicle larger, the primary branches bearing appressed secondary branchlets with few to several spike-



FIGURE 205.—*Eragrostis tephrosanthos*. Panicle, $\times 1$; floret, $\times 10$. (Curtiss 5930, Fla.)

Open ground, fields, and waste places, Florida to southern Texas and south through the lowland Tropics to Brazil.

21. *Eragrostis multicaulis* Steud. (Fig. 206.) Annual; resembling *E. tephrosanthos*, but the axils of the panicle glabrous; panicle branches spikelet-bearing nearly to base; spikelets mostly 4- to 8-flowered, mostly 3 to 4 mm. long. ☉ (*E. peregrina* Wiegand.)—Waste places, Maine to Wisconsin, south to Pennsylvania and Virginia; ballast, Portland, Oreg.; introduced from Eurasia.

22. *Eragrostis orcuttiána* Vasey. (Fig. 207.) Annual; culms ascending from a decumbent base, rather stout, 60 to 100 cm. tall; blades flat, 2 to 6 mm. wide; panicle open, 15 to 30 cm. long, the branches, branchlets, and pedicels slender, spreading, flexuous, finally implicate, the axils glabrous; spikelets linear, 6- to 10-flowered,

sometimes a little falcate, 5 to 7 mm. long, about 1 mm. wide; second glume a little more than 1 mm. long; lemmas loosely imbricate (the rachilla often exposed), narrow, acutish, the



FIGURE 206.—*Eragrostis multicaulis*. Panicle, $\times 1$; floret, $\times 10$. (Hotchkiss 1708, N. Y.)



FIGURE 207.—*Eragrostis orcuttiána*. Panicle, $\times 1$; floret, $\times 10$. (Hitchcock 3063, Calif.)

lower 1.8 mm. long; grain 0.8 mm. long. ☉ —Fields, waste places, and sandy river banks, Oregon (ballast, Portland); Colorado to Arizona and California.

23. *Eragrostis lutescens* Scribn. (Fig. 208.) Annual; culms freely branching at base, erect or ascending, 5 to 20 cm. tall; sheaths and blades with numerous glandular depressions; blades flat; panicles numerous, narrow, erect, pale or yellowish green, 2 to 10 cm. long, the branches ascending or appressed, beset with glandular depressions; spikelets 6- to 10-flowered, 5 to 7 mm. long, compressed; glumes acute, 1.5 and 2 mm. long; lemmas about 2 mm. long, acute, the nerves prominent; palea 1.5 mm. long. ☉ —Sandy shores, Idaho to Washington, south to Colorado, Arizona, and California; Mexico.

24. *Eragrostis cilianensis* (All.) Lutati. STINKGRASS. (Fig. 209.) Weedy annual with disagreeable odor when fresh; culms ascending or spreading, 10 to 50 cm. tall, with a ring of glands below the nodes; foliage sparsely beset with glandular depressions, the sheaths pilose at the throat; blades flat, 2 to 7 mm. wide; panicle erect, dark gray green to tawny, usually rather condensed, sometimes, especially in the Southwest, open, 5 to 20 cm. long, the branches ascending; spikelets oblong, compressed, 10- to 40-flowered, 5 to 15 mm. long, 2.5 to 3 mm. wide; lemmas in side view ovate, acutish, about 2.5 mm. long, 1 mm. wide from keel to margin, the keel scabrous toward apex and beset with a few glands, the lateral nerves prominent; palea about two-thirds as long as the lemma, minutely ciliate on the keels; grain ovoid, plump, 0.7 mm. long; anthers 0.5 mm. long. ☉ (*E. major* Host; *E. megastachya* Link.)—Cultivated ground, fields, and waste places, Maine to Washington, south throughout the United States, sparingly in the Northwest, absent from the higher mountains; Mexico and West Indies, south to Argentina; introduced from the Old World.



FIGURE 208.—*Eragrostis lutescens*. Plant, $\times \frac{1}{2}$; floret, $\times 10$. (Type.)

25. *Eragrostis poaeoides* Beauv. ex Roem. and Schult. (Fig. 210.) Annual; resembling *E. cilianensis*, mostly more slender; panicles rather more open, the spikelets smaller, 1.5 to 2 mm. wide, the lemmas about 2 mm. long, the glands sometimes obscure; anthers about 0.2 mm. long. ☉ (*E. minor* Host; *E. eragrostis* Beauv.)—Waste places, sparingly introduced from Europe, Maine to Wisconsin and Iowa, south to Georgia, Oklahoma, and Texas; California.

26. *Eragrostis barreliéri* Daveau. (Fig. 211.) Annual; culms erect or decumbent at base, 20 to 50 cm. tall, branching at base, sometimes with a glandular band below the nodes; sheaths pilose at the summit; blades flat, rather short, 2 to 4 mm. wide; panicle erect, open but narrow, 8 to 15 cm. long, the branches ascending or stiffly spreading, few-flowered, spikelet-bearing nearly to base, the



FIGURE 209.—*Eragrostis cilianensis*. Plant, $\times \frac{1}{2}$; spikelet, $\times 5$; floret, $\times 10$. (Schuette 155, Wis.)

axils glabrous; spikelets linear, usually 12- to 15-flowered, mostly about 1 cm. long and 1.5 mm. wide; lemmas 2 mm. long or slightly longer. ☉ —Waste places, Colorado and Kansas to Texas and California; Mexico; introduced from southern Europe.

27. *Eragrostis neomexicana* Vasey. (Fig. 212.) Annual; culms usually rather stout, often widely spreading, as much as 1 m. tall; sheaths gla-



FIGURE 210.—*Eragrostis poaeoides*. Panicle, $\times 1$; floret, $\times 10$. (Dutton 2235, Vt.)

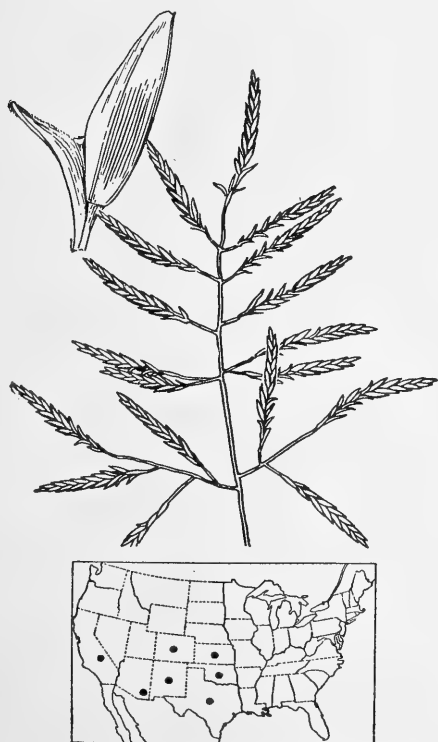


FIGURE 211.—*Eragrostis barrelieri*. Panicle, $\times 1$; floret, $\times 10$. (Hitchcock 5280, Tex.)

brous, pilose at the throat, often with glandular depressions along the keel or nerves; blades flat, often elongate, 5 to 10 mm. wide; panicle 20 to 40 cm. long, smaller in depauperate specimens, open, the branches ascend-



FIGURE 212.—*Eragrostis neomexicana*. Panicle, $\times 1$; floret, $\times 10$. (Type.)

ing or spreading but not divaricate, the branchlets at first appressed along the main branches, finally usually spreading, the axils glabrous; spikelets mostly dark grayish green, ovate to ovate-oblong, or rarely linear, mostly 8- to 12-flowered, 5 to 8 mm. long, about 2 mm. wide; lemmas 2 to 2.3 mm. long. ☉ —Fields, waste places, and wet ground, Texas to southern California, south through Mexico; introduced in Maryland, Indiana, Wisconsin, Iowa, North Dakota, and Missouri.



FIGURE 213.—*Eragrostis mexicana*. Panicle, $\times 1$; floret, $\times 10$. (Smith, N. Mex.)

28. *Eragrostis mexicana* (Hornem.) Link. MEXICAN LOVEGRASS. (Fig. 213.) Resembling *E. neomexicana*, but lower, erect or spreading, often simple; panicle erect, comparatively small and few-flowered, less compound, the branches and pedicels spreading; spikelets usually not more than 7-flowered. ☉ —Open ground, Texas to California; Mexico.

29. *Eragrostis árida* Hitchc. (Fig. 214.) Annual; culms branching at base, erect or more or less decumbent at base, 20 to 40 cm. tall; sheaths not glandular, the hairs at summit in a dense line part way along the collar; blades mostly flat, glabrous, tapering to a fine point, mostly 4 to 8 cm. long, 1 to 2 mm. wide; panicle mostly one-third to half the entire length of the plant, open, the branches, branchlets, and pedicels flexuous, spreading, the lower axils sparsely pilose, the branches solitary or the lower in pairs; spikelets oblong to linear, stramineous or drab, mostly 8- to 15-flowered, 5 to 10 mm. long, 1.5 to 2 mm. wide, somewhat compressed, the lateral pedicels 2 to 3 mm. long; glumes acute, the first narrow, scarcely 1 mm. long, the second a little longer and wider; lemmas 1.6 to 1.8 mm. long, acutish. ☉ —Dry soil, Missouri; Texas to California and central Mexico.

30. *Eragrostis hirsuta* (Michx.) Nees. (Fig. 215.) Perennial; culms erect, tufted, 50 to 120 cm. tall; sheaths hirsute to glabrous, pilose at the throat and especially along the collar at each side; blades flat, elongate, 5 to 10 mm. wide, becoming

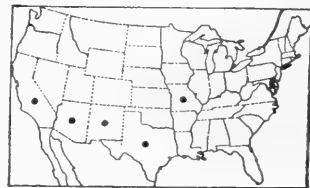


FIGURE 214.—*Eragrostis árida*. Panicle, $\times 1$; floret, $\times 10$. (Type.)

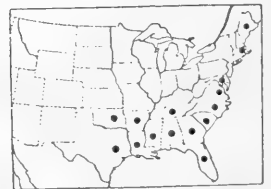
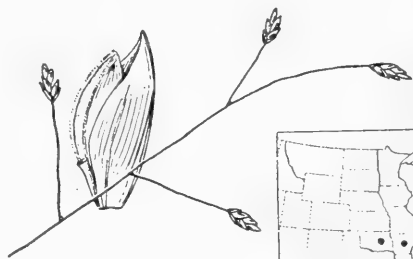


FIGURE 215.—*Eragrostis hirsuta*. Panicle, $\times 1$; floret, $\times 10$. (Curtiss 3499, Fla.)

more or less involute, tapering to a fine point, scabrous on the upper surface; panicle diffuse, more than half the entire height of the plant, pilose in the axils, branching 4 or 5



FIGURE 216.—*Eragrostis lugens*. Plant, $\times 1$; floret, $\times 10$. (Reverchon 16, Tex.)

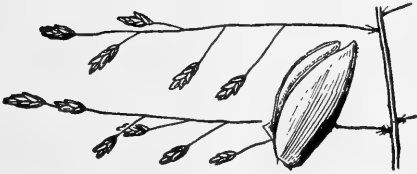


FIGURE 217.—*Eragrostis trichocolea*. Panicle, $\times 1$; floret, $\times 10$. (Curtiss, Fla.)

times; spikelets on long flexuous pedicels, ovate to ovate-oblong, 2- to 6-flowered (rarely to 8-flowered), 3 to 4 mm. long; glumes acuminate, 1.5 and 2 mm. long; lemmas rather turgid, 2 mm. long, acute, the nerves obscure; grain oblong, 1 mm. long, minutely striate and pitted. 21 — Dry soil, fields and open woods, Maryland to Oklahoma, south to Florida and eastern Texas; British Honduras; introduced in Maine and Massachusetts. Plants with glabrous sheaths have been segregated as *E. hirsuta* var. *laevivaginata* Fern.

31. *Eragrostis lúgens* Nees. (Fig. 216.) Perennial; culms tufted, rather wiry, sometimes geniculate below, sparingly branching; sheaths pilose in the throat, sometimes along the margin and on sides at summit; blades subinvolute, 10 to 25 cm. long, 1.5 to 3 mm. wide, pilose on the upper surface toward base, rarely beneath; panicle rather diffuse, 15 to 30 cm. long, about two-thirds as wide, the axis and ascending to spreading branches capillary, flexuous, the lower branches in pairs or verticils, the axils, except upper, conspicuously long pilose; spikelets on long pedicels, mostly glossy drab, 3- to 7-flowered, 3 to 5 mm. long, 1 to 1.2 mm. wide;

glumes thin, 0.7 and 1.2 mm. long, falling early; lemmas closely imbricate, 1.3 to 1.5 mm. long, abruptly acute; grain about 0.7 mm. long. 21 — Dry prairie, Florida, Louisiana, and Texas; also on ballast, Mobile, Ala.; Mexico and Venezuela to Argentina.

32. *Eragrostis trichocólea* Hack. and Arech. (Fig. 217.) Perennial; culms erect, 30 to 60 cm. tall, the leaves rather short, mostly crowded at the base; sheaths, at least the lower, spreading, pilose; blades spreading, flat or, especially on the innovations, involute, mostly 8 to 12 cm. long, 2 to 4 mm. wide, pilose; panicle diffuse, 15 to 20 cm. long, nearly or quite as wide, the branches stiffly and widely spreading, pilose in the axils; pedicels 2 or 3 times as long as the spikelets; spikelets 3- to 5-flowered, 3 to 4 mm. long, about 1.5 mm. wide; glumes 1 to 1.2 and 1.3 to 1.5 mm. long; lemmas about 1.5 mm. long. 21 — Sandy woods, Florida (Tampa, Lakeland) and Texas; Mexico to Uruguay.

33. *Eragrostis erósa* Scribn. (Fig. 218.) Perennial; culms tufted, erect, 50 to 90 cm. tall; blades mostly involute; panicle diffuse, less than half the entire height of the plant, usually about one-third, mostly more than half as wide as long, branching 2 or 3 times, sparsely pilose or glabrous in the axils; spikelets mostly 8- to 9-flowered, 5 to 10 mm. long, 1.8 to 2 mm. wide; lemmas 2.5 to 3 mm. long, hyaline-margined toward summit, the tip erose. 21 — Rocky



FIGURE 218.—*Eragrostis erosa*. Panicle, $\times 1$ (Skehan 58, N. Mex.); floret, $\times 10$. (Type.)

hills, western Texas to New Mexico and northern Mexico.

34. *Eragrostis palméri* S. Wats. (Fig. 219.) Perennial; culms tufted, erect, about 70 cm. tall; blades involute, elongate, erect; panicle open, oblong, 15 to 20 cm. long, 5 to 7 cm. wide, glabrous in the axils; spikelets 5 to 7 mm. long, mostly 7- to 9-flowered, brownish; first glume about 1 mm. long; second glume 1.5 to 2 mm. long; lemmas rounded on the back, bronze-tipped, about 2 mm. long. ♀ —Alkaline banks, Texas; Mexico (Juárez, Coahuila). Differs from *E. erosa* in the oblong panicle and smaller spikelets and lemmas.

35. *Eragrostis intermedia* Hitchc. PLAINS LOVEGRASS. (Fig. 220.) Perennial; culms erect, tufted, mostly 40 to 80 cm. tall; sheaths glabrous or the lowermost sparsely pilose, conspicuously pilose at the throat, the hairs extending in a line across the collar; blades flat to subinvolute, pilose on the upper surface near the base, otherwise glabrous or with a few scattered hairs, 10 to 25 cm. long, 1 to 3 mm. wide; panicle erect, open, often diffuse, 15 to 35 cm.



FIGURE 219.—*Eragrostis palméri*. Panicle, $\times 1$; floret, $\times 10$. (Silveus 851, Tex.)

long, at maturity mostly about three-fourths as wide, the axils pilose, sometimes sparsely so or rarely glabrous, the branches slender but rather stiff, the lower in pairs or verticils, all spreading, often horizontal; spikelets usually 3- to 8-flowered, 3 to 10 mm. long, about 1.5 mm. wide, grayish or brownish green, the pedicels somewhat flexuous, 1 to 3 times as

long as the spikelet; glumes acute, 1 to 1.2 and 1.2 to 1.4 mm. long; lemmas turgid, obscurely nerved, 1.8 to 2 mm. long, usually bronze-tipped, not hyaline-margined; grain oblong, about 0.7 mm. long. 2 —Dry or sandy prairies, Georgia; Louisiana and Missouri to Arizona and south

obscure glandular band below the nodes; sheaths sparingly pilose at the throat; blades involute, glabrous, arching-recurved, 10 to 30 cm. long; panicle erect, open, 10 to 20 cm. long, the branches ascending or spreading, glabrous, stiffly flexuous; spikelets oblong to linear, stramineous or



FIGURE 220.—*Eragrostis intermedia*. Panicle, $\times 1$; floret, $\times 10$. (Type.)



FIGURE 221.—*Eragrostis swallenii*. Plant and panicle, $\times 1$; floret and glandular band, $\times 10$. (Type.)

to Central America. A few specimens from New Mexico have long spikelets (as much as 13-flowered) and glabrous axils.

36. *Eragrostis swallenii* Hitchc. (Fig. 221.) Perennial; culms in dense tufts, erect, 20 to 50 cm. tall, an

grayish green, 7 to 10 mm. long, about 2 mm. wide, mostly 8- to 12-flowered, the slender pedicels bearing above the middle a glandular band or spot; glumes acutish, rather broad, about 1.2 and 1.8 mm. long; lemmas rather closely imbricate, acutish,

about 2 mm. long; palea minutely scabrous on the keels; grain nearly smooth, slightly narrowed toward the summit, 1 mm. long. 2 —Sandy prairies, southern Texas; northern Mexico.

37. *Eragrostis trácyi* Hitchc. (Fig. 222.) Apparently perennial; culms erect, tufted, 30 to 80 cm. tall; sheaths rather sparsely pilose at the throat; blades flat or, especially of the innovations, involute, 5 to 25

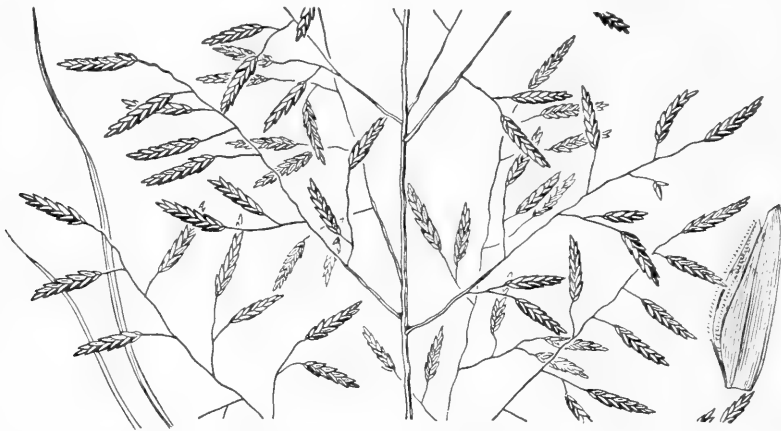


FIGURE 222.—*Eragrostis trácyi*. Panicle, $\times 1$; floret, $\times 10$. (Type.)



FIGURE 223.—*Eragrostis silveana*. Panicle, $\times 1$; spikelet, $\times 10$. (Type.)

cm. long, 1 to 3 mm. wide; panicle erect, open, 10 to 15 cm. long, 5 to 8 cm. wide, the axils glabrous or nearly so, the branches ascending to spreading, flexuous; spikelets linear, mostly 9- to 15-flowered, 5 to 10 mm. long, about 1.5 mm. wide, pinkish or purplish, the flexuous pedicels spreading, 2 to 5 mm. long; glumes acutish, about 1 mm. and 1.5 mm. long; lemmas 1.5 to 2 mm. long, rather soft, loosely imbricate, the lateral nerves distinct; palea somewhat persistent; grain about 0.7 mm. long. ♀ —Sandy soil, known only from Sanibel Island, Fla.

39. *Eragrostis trichodes* (Nutt.) Wood. (Fig. 224.) Perennial; culms tufted, erect, 60 to 120 cm. tall; sheaths pilose at the summit, sometimes on the upper half; blades flat to subinvolute, elongate, 2 to 6 mm. wide, tapering to a slender point, scabrous on the upper surface; panicle usually purplish, diffuse, oblong, usually about half the entire height of the culm, branching 3 or 4 times, the branches capillary, loosely ascending, sparsely pilose in the axils; spikelets long-pedicel, lanceolate to ovate-oblong, mostly 4- to 6-flowered, 4 to 7 mm. long; glumes acuminate, nearly



FIGURE 224.—*Eragrostis trichodes*. Panicle, $\times 1$; floret, $\times 10$. (Reverchon, Tex.)

38. *Eragrostis silveana* Swallen. (Fig. 223.) Perennial; culms densely tufted, erect from a knotty base, 40 to 50 cm. tall; sheaths glabrous; blades flat or loosely involute in drying, elongate, 3 mm. wide, attenuate to a fine point, glabrous; panicle 25 to 35 cm. long, 10 to 15 cm. wide, the viscid scabrous branches stiffly ascending or spreading, naked at base, sparsely pilose in the axils; spikelets purplish, 4- to 8-flowered, 2.5 to 4 mm. long, the ultimate pedicels short, usually appressed; glumes about 1 mm. long; lemmas acute, about 1.3 mm. long, the lateral nerves prominent. ♀ —Open ground, southern Texas.

equal, 2.5 to 3 mm. long, about as long as the first floret; lemmas 2.5 to 3 mm. long, acute, subcompressed, the keel and lateral nerves strong; grain 1 mm. long, minutely pitted; anthers a little more than 1 mm. long. ♀ —Sand barrens and open sandy woods, Illinois to Colorado and Texas.

40. *Eragrostis pilifera* Scheele. (Fig. 225.) Resembling *E. trichodes*, often in smaller tufts and taller; panicle stramineous or golden bronze; spikelets linear, 8- to 15-flowered, 8 to 12 mm. long; glumes and lemmas about 3 mm. long. ♀ (*E. grandiflora* Smith and Bush.)—Sand hills

and sand barrens, Illinois and Nebraska to Louisiana and Texas.

41. *Eragrostis spectabilis* (Pursh) Steud. PURPLE LOVEGRASS. (Fig. 226.) Perennial, in dense tufts, rarely producing short or slender rhizomes; culms stiffly erect to spreading, 20 to 60 cm. tall; sheaths glabrous or pilose, conspicuously hairy at the throat; blades flat or folded, rather firm, stiffly ascending, tapering to a fine point, glabrous or rarely pilose, mostly 3 to 8 mm. wide; panicle at first included at base, two thirds the

Sandy soil, Maine to Minnesota, south to Florida and Arizona; Mexico (San Luis Potosí). This species was formerly generally called *E. pectinacea*.

42. *Eragrostis elliottii* S. Wats. (Fig. 227.) Perennial; culms tufted, stiffly erect or spreading, 40 to 80 cm. tall; sheaths glabrous, pilose at the throat; blades flat, elongate, scabrous on the upper surface, 2 to 4 mm. wide; panicle diffuse, fragile, usually more than half the entire height of the plant, branching 3 or 4 times, the

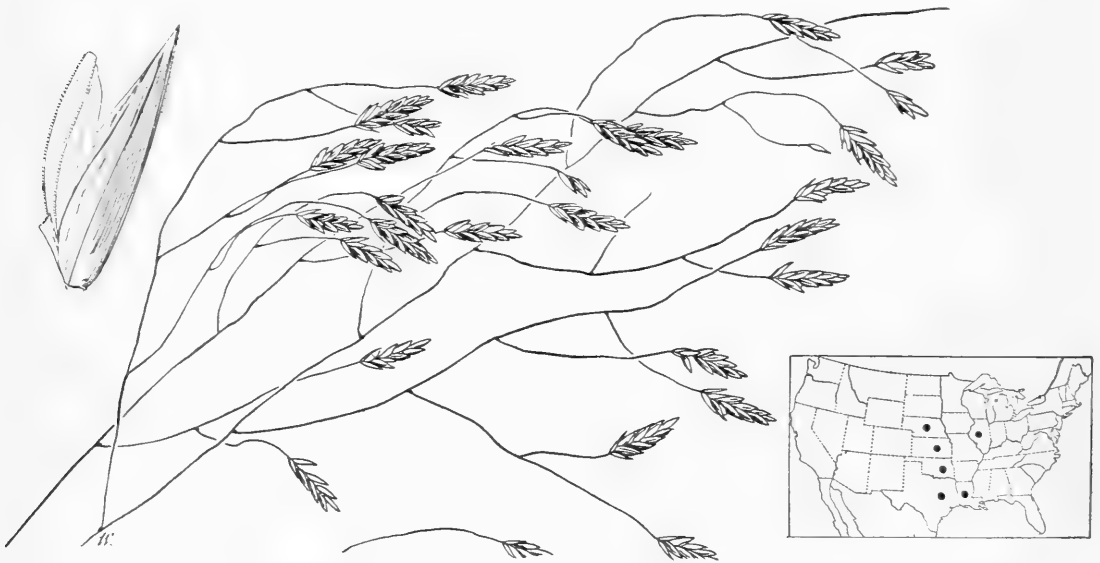


FIGURE 225.—*Eragrostis pilifera*. Panicle, $\times 1$; floret, $\times 10$. (Rydberg 1831, Nebr.)

entire height of the culm, diffuse, bright purple, rarely pale, branching 3 or 4 times, the axis stiff, the branches stiffly spreading toward maturity, rarely pilose, strongly pilose in the axils, the lower shorter than the middle ones, finally reflexed, the whole panicle finally breaking away and tumbling before the wind; spikelets long-pedicel, short-pedicel toward the ends of the branches; oblong to linear, 6- to 12-flowered, 4 to 8 mm. long; glumes acute, a little more than 1 mm. long; lemmas acute, about 1.5 mm. long, slightly scabrous toward the tip, the lateral nerves prominent toward the base; palea somewhat bowed out, exposing the rather prominently short-ciliate keels; grain oval, dark-brown, 0.6 mm. long. 21 —

branches capillary, spreading; spikelets on long capillary spreading pedicels, linear, mostly 8- to 15-flowered, 5 to 12 mm. long, about 2 mm. wide, pale or gray; glumes acute, 1 and 1.5 mm. long; lemmas closely imbricate, acute, about 2 mm. long, bowed out below, fitting into the angles of the zigzag rachilla; grain oval, 0.7 mm. long. 21 — Low ground, wet meadows, and low pine woods, Coastal Plain, North Carolina to Florida and eastern Texas; West Indies and eastern Mexico.

43. *Eragrostis acúta* Hitchc. (Fig. 228.) Perennial; culms erect, 40 to 60 cm. tall; sheaths glabrous, pilose at the throat; blades flat, becoming more or less involute, 2 to 4 mm. wide; panicle diffuse, more than half

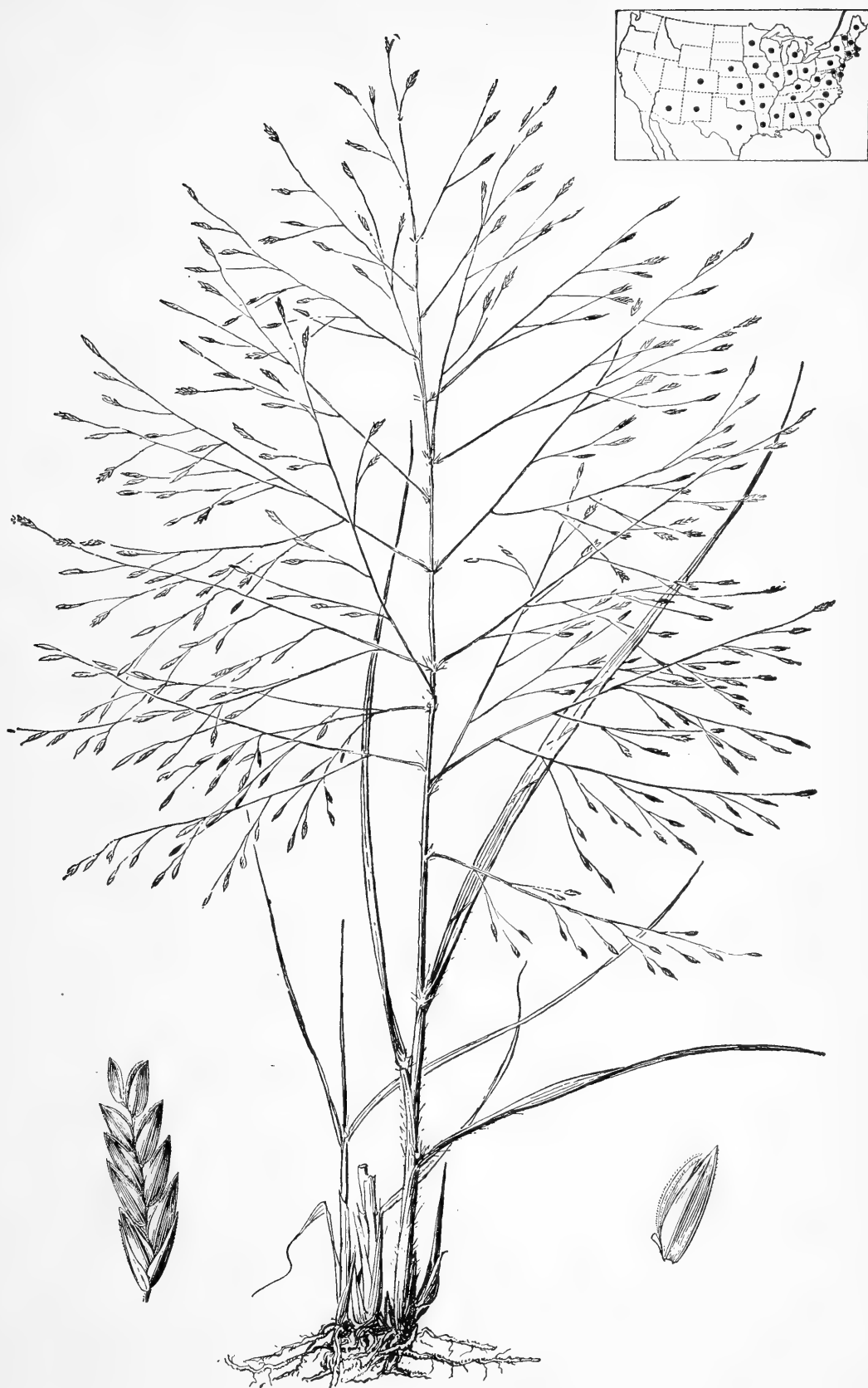


FIGURE 226.—*Eragrostis spectabilis*. Plant, $\times \frac{1}{2}$; spikelet, $\times 5$; floret, $\times 10$. (Hitchcock 7849, Md.)

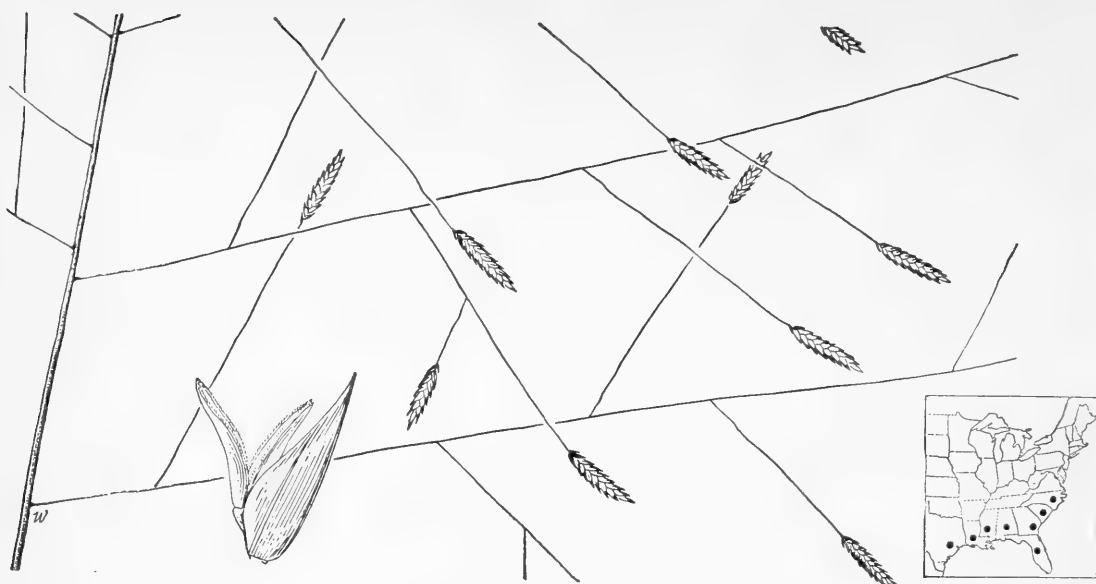


FIGURE 227.—*Eragrostis eliottii*. Panicle, $\times 1$; floret, $\times 10$. (Tracy 7384, Fla.)



FIGURE 228.—*Eragrostis acuta*. Panicle, $\times 1$; floret, $\times 10$. (Type.)

the entire height of the plant, branching 3 or 4 times, the branches less fragile than in *E. eliottii*; spikelets on long spreading pedicels, oblong-elliptic, 10- to 20-flowered, 8 to 14 mm. long, 3 mm. wide, pale or stramineous; glumes acuminate, 2.5 and 3 mm.

long; lemmas acuminate, 3 mm. long; grain 0.8 mm. long. 21 —Low pine woods and moist sandy soil, peninsular Florida.

44. *Eragrostis refrácta* (Muhl.) Scribn. (Fig. 229.) Resembling *E. eliottii*; blades more or less pilose on

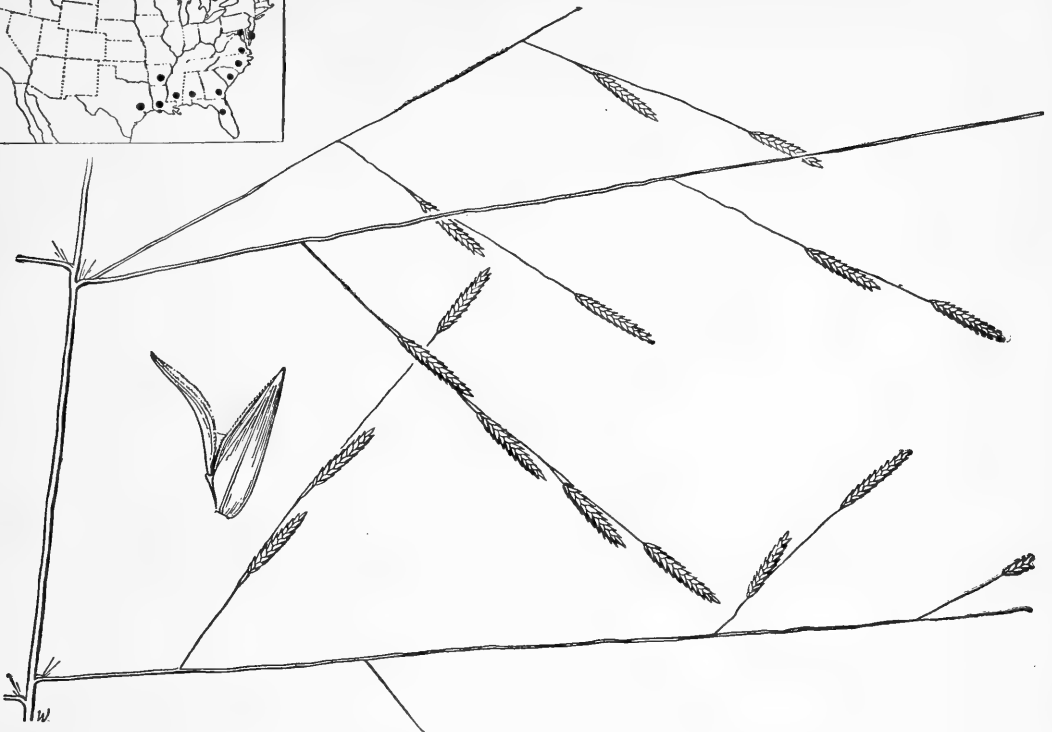
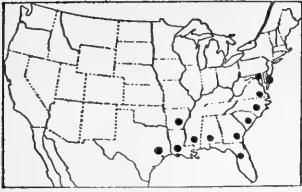


FIGURE 229.—*Eragrostis refracta*. Panicle, $\times 1$; floret, $\times 10$. (Kearney 1922, N. C.)

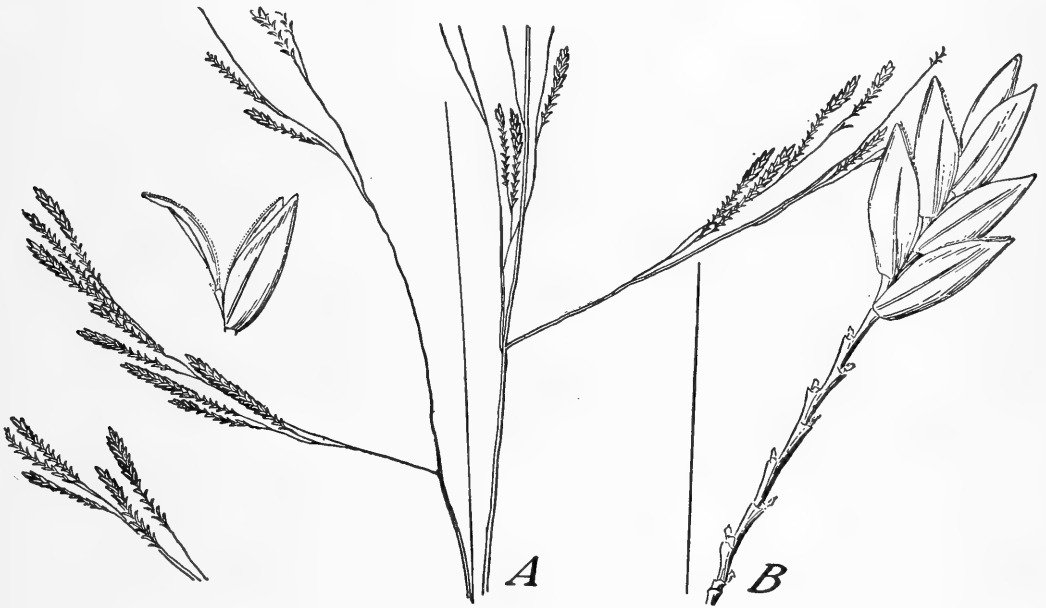


FIGURE 230.—A, *Eragrostis bahiensis*. Panicle, $\times 1$; floret, $\times 10$. (Hitchcock 19862, La.) B, *E. chariis*, $\times 10$. (Weatherwax 822, Fla.)

the upper surface near base; lower panicle branches usually finally reflexed, long-pilose in the axils; spikelets short-pedicelcd, appressed and distant along the nearly simple panicle branches, the lemmas on the average shorter than in *E. elliotii*. 2 —Low sandy soil, Coastal Plain,

Delaware to Florida, Arkansas, and eastern Texas.

45. *Eragrostis chariis* (Schult.) Hitchc. (Fig. 230, B.) Perennial; culms erect or ascending at base, 60 to 120 cm. tall; panicle open, 7 to 15 cm. long, nodding, the branches glabrous or with a few hairs in the axils,

ascending, solitary, rather distant, naked below, rather closely flowered with ascending or appressed branchlets; spikelets linear, 5 to 10 mm. long, 8- to 20-flowered; glumes about 1.3 and 1.7 mm. long; lemmas 1.5 to 2 mm. long, imbricate; palea persistent only a short time after the fall of the lemma, the naked rachilla persisting. ♀ —Sandy roadsides, Florida (St. Petersburg); introduced from southeastern Asia.

46. *Eragrostis bahiënsis* Schrad. (Fig. 230, A.) Resembling *E. chariis*; panicle often more or less condensed; spikelets as much as 30-flowered; lemmas about 2 mm. long; palea persistent. ♀ —Introduced, Florida (Milton, Pensacola), Alabama (Mobile), and Louisiana (Avery Island); Brazil.

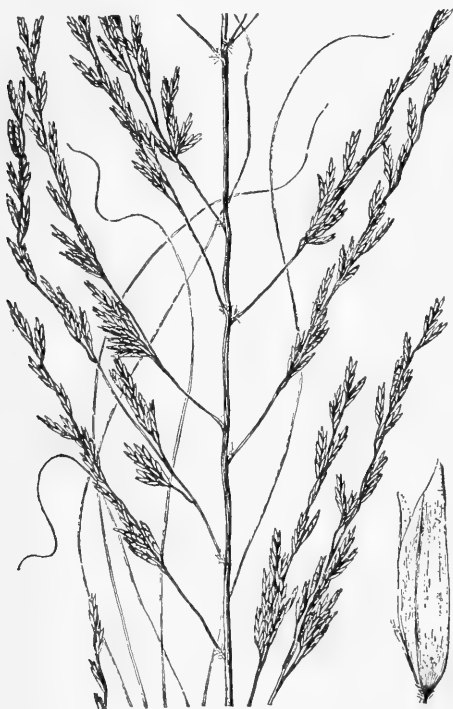


FIGURE 231.—*Eragrostis curvula*. Panicle, $\times 1$; floret, $\times 10$. (Silveus 2156, cult., Tex.)

47. *Eragrostis cúrvula* (Schrad.) Nees. WEEPING LOVEGRASS. (Fig. 231.) Culms 60 to 120 cm. tall, densely tufted, erect, simple or sometimes branching at the lower nodes; sheaths narrow, keeled, glabrous or sparsely hispid, the lower densely hairy toward the base; blades elongate, involute, attenuate to a fine point, arcuate spreading, scabrous; panicles 20 to 30 cm. long, the branches solitary or in pairs, ascending, naked at the base, at least the lower densely pilose in the axils; spikelets 7- to 11-flowered, 8 to 10 mm. long, gray green; lemmas about 2.5 mm. long, obtuse or subacute, the nerves prominent. ♀ —Cultivated for ornament; spontaneous in Florida, Texas, and Arizona. Useful in erosion control and showing promise of being valuable in revegetation of grasslands in the Southern States.

***Eragrostis lehmanniána* Nees.** LEHMANN LOVEGRASS. Perennial; culms finally prostrate, 30 to 80 cm. long, the nodes rooting and producing tufts of branches; panicles 10 to 15 cm. long, open; spikelets linear, 10 to 12 mm. long. ♀ —Introduced from Africa, drought-resistant and proving effective in erosion control, Texas, Oklahoma, and Arizona (well established near Tucson).

***Eragrostis stenophýlla* Hochst.** Erect smooth annual, 30 to 40 cm. tall, with loosely involute blades and rather loose panicle with ascending branches, the linear spikelets several-flowered, the lemmas 1.3 mm. long. ☉ —Florida, Mississippi (Biloxi), probably escaped from grass garden; India.

***Eragrostis cyperoídes* (Thunb.) Beauv.** Stiff stout stoloniferous perennial with sharp-pointed blades and narrow elongate interrupted panicles, the distant branches with naked thornlike tips; spikelets coriaceous, crowded. ♀ —Oregon (Linnton), on ballast; South Africa.

ERAGROSTIS TEF (Zuccagni) Trotter. TEFF. Annual; culms branching and spreading, 30 to 100 cm. tall; panicle large and open; spikelets 5- to 9-flowered, 6 to 8 mm. long. ☉ (*E. abyssinica* (Jacq.) Link.)—Occasionally cultivated for ornament. Africa, where the seed is used for food.

ERAGROSTIS OBTÚSA Munro. Low branching perennial; panicles open, 5 to 10 cm. long; spikelets gray olivaceous, broadly ovate, the lemmas almost horizontally spreading. ♀ —Occasionally cultivated for ornament. South Africa.

ERAGROSTIS CHLOROMÉLAS Steud. BOER LOVEGRASS. Erect branching perennial, 40 to 90 cm. tall, forming dense clumps; blades elongate, subinvolute; panicle 10 to 20 cm. long, loose; spikelets dark olivaceous. 2
—Introduced from Africa, drought-resistant and promising in erosion control in the Southwest.

* 15. *CATABRÓSA* Beauv.

Spikelets mostly 2-flowered, the florets rather distant, the rachilla disarticulating above the glumes and between the florets; glumes unequal, shorter than the lower floret, flat, nerveless, irregularly toothed at the broad truncate apex; lemmas broad, prominently 3-nerved, the nerves parallel, the broad apex scarious; palea about as long as the lemma, broad, scarious at apex. Aquatic perennials, with creeping bases, flat soft blades, and open panicles. Type species, *Catabrosa aquatica*. Name from Greek *katabrosis*, an eating up or devouring, referring to the toothed or erose glumes.

1. *Catabrosa aquática* (L.) Beauv. BROOKGRASS (Fig. 232.) Glabrous throughout; culms 10 to 40 cm. long;

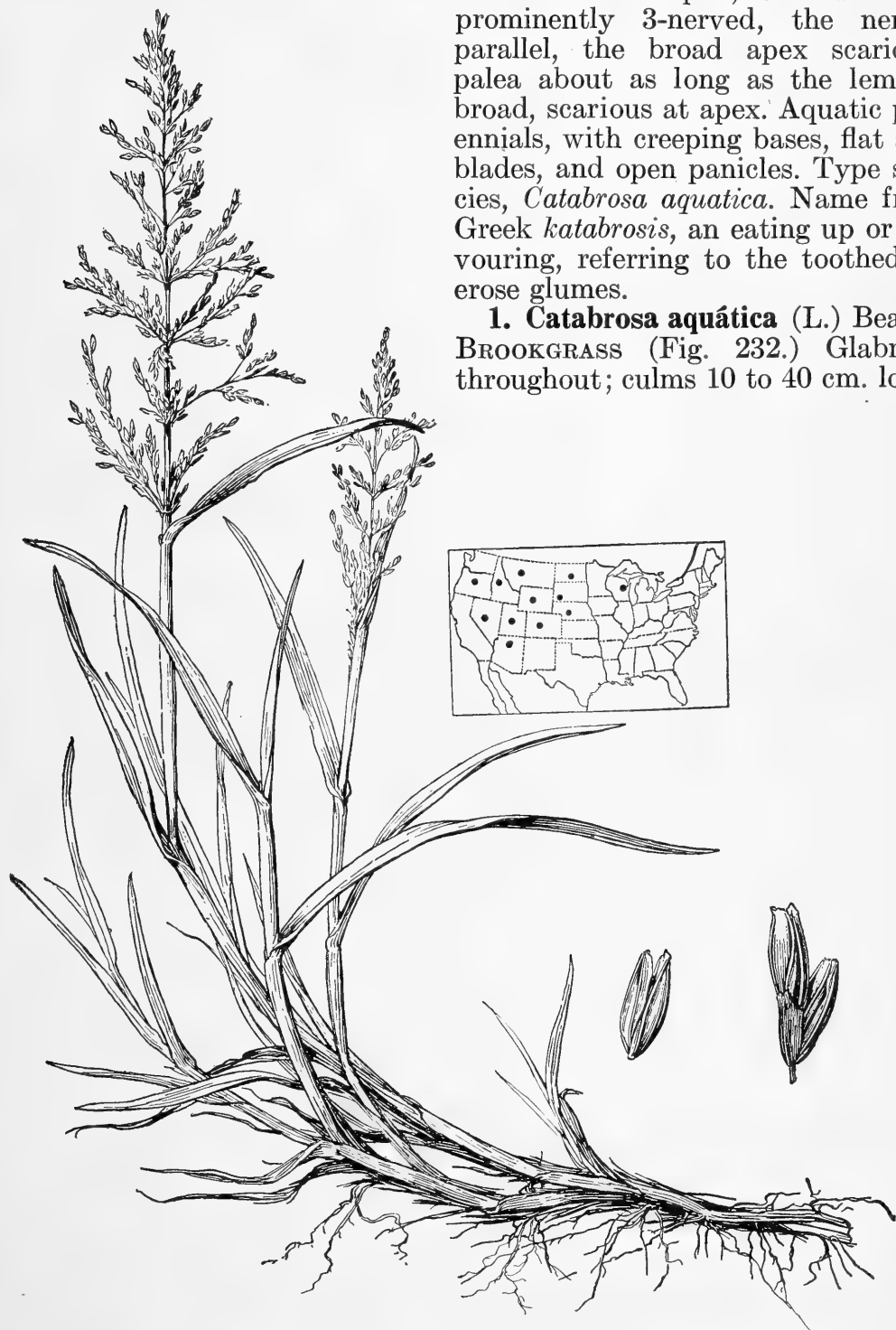


FIGURE 232.—*Catabrosa aquatica*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Williams and Fernald, Quebec.)



FIGURE 233.—*Molinia caerulea*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Kirk 157, Vt.)

blades mostly less than 10 cm. long, 2 to 8 mm. wide; panicle erect, 10 to 20 cm. long, oblong or pyramidal, yellow to brown, the branches spreading in somewhat distant whorls; spikelets short-pedicel, about 3 mm. long; glumes about 1.5 and 2 mm. long; lemmas 2.5 to 3 mm. long. 2 —Mountain meadows, around springs and along streams, Newfoundland and Labrador to Alberta, south through Wisconsin, North Dakota, South Dakota, and eastern Oregon to northern Arizona; Eurasia. Sometimes 1-flowered spikelets occur in panicles with 2-flowered ones.

Cutándia memphítica (Spreng.) Richt. Low annual; blades flat; panicle few-flowered; spikelets on short pedicels, finally divergent on the zig-zag branches. ☉ —San Bernardino Mountains, Calif.; introduced from the Mediterranean region.

16. MOLÍNIA Schrank

Spikelets 2- to 4-flowered, the florets distant, the rachilla disarticulating above the glumes, slender, prolonged beyond the upper floret and bearing a rudimentary floret; glumes somewhat unequal, acute, shorter than the first lemma, 1-nerved; lemmas membranaceous, narrowed to an obtuse point, 3-nerved; palea bowed out below, equaling or slightly exceeding the lemma. Slender tufted perennials, with flat blades and narrow, rather open panicles. Type species, *Molinia caerulea*. Named for J. I. Molina.

1. Molinia caerulea (L.) Moench. (Fig. 233.) Culms erect, 50 to 100 cm. tall; blades 2 to 7 mm. wide, erect, tapering to a fine point; panicle 10 to 20 cm. long, purplish, the branches ascending, rather densely flowered, mostly floriferous to the base; spikelets short-pedicel, 4 to 7 mm. long; lemmas about 3 mm. long. 2 — Meadows and fields, introduced in a few localities, Maine to Pennsylvania; Eurasia.

17. DIARRHÉNA Beauv.

(*Diarina* Raf.)

Spikelets few-flowered, the rachilla disarticulating above the glumes and between the florets; glumes unequal, acute, shorter than the lemmas, the first 1-nerved, the second 3- to 5-nerved; lemmas chartaceous, pointed, 3-nerved, the nerves converging in the point, the upper floret reduced; palea chartaceous, obtuse, at maturity the lemma and palea widely spread by the large turgid beaked caryopsis with hard shining pericarp; stamens 2 or 3. Perennials, with slender rhizomes, broadly linear, flat blades, long-tapering below, and narrow, few-flowered panicles. Type species, *Diarrhena americana*. Name from Greek *dis*, twice, and *arren*, male, alluding to the two stamens.

1. Diarrhena americana Beauv. (Fig. 234.) Culms slender, about 1 m. tall, arched-leaning, leaves approximate below the middle of the culm; sheaths pubescent toward the summit; blades elongate, 1 to 2 cm. wide, scabrous to pubescent beneath; panicle long-exserted, drooping, 10 to 30 cm. long, the branches few, appressed, the lower distant; spikelets 10 to 18 mm. long, at first narrow, the florets expanded at maturity; lemmas 6 to 10 mm. long. 2 (*Diarina festucoides* Raf.)—Rich or moist woods, Virginia to Michigan and South Dakota, south to Tennessee, Arkansas, Oklahoma, and eastern Texas.

18. DISSANTHÉLIUM Trin.

Spikelets mostly 2-flowered, the rachilla slender, disarticulating above the glumes and between the florets; glumes firm, nearly equal, acuminate, much longer than the lower floret, mostly exceeding all the florets, the first 1-nerved, the second 3-nerved; lemmas strongly compressed, oval or elliptic, acute, 3-nerved, the lateral nerves near the margin; palea some-



FIGURE 234.—*Diarrhena americana*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Wilcox 66, Ill.)

what shorter than the lemma. Annuals or perennials with narrow panicles. Type species, *Dissanthelium supinum* Trin. Name from Greek, *dissos*, double, and *anthelion*, a small flower, alluding to the two small florets.

1. *Dissanthelium californicum* (Nutt.) Benth. (Fig. 235.) Annual, lax; culms more or less decumbent or spreading, about 30 cm. tall; blades flat, 10 to 15 cm. long, 2 to 4 mm. wide; panicle 10 to 15 cm. long, narrow but rather loose, the branches in fascicles, ascending, slender, flexuous, some of them floriferous to base; glumes narrow, acute, nearly equal, about 3 mm. long; lemmas pubescent, nearly 2 mm. long. ☉ —Open ground, islands off the southern coast of California and of Baja California.

19. REDFIELDIA Vasey

Spikelets compressed, mostly 3- or 4-flowered, the rachilla disarticulating above the glumes and between the florets; glumes somewhat unequal, 1-nerved, acuminate; lemmas chartaceous, 3-nerved, the nerves parallel, densely villous at base; palea as long as the lemma; grain free. A rather tall perennial, with extensive rhizomes, and a large panicle with diffuse capillary branches. Type species, *Redfieldia flexuosa*. Named for J. H. Redfield.

1. *Redfieldia flexuosa* (Thurb.) Vasey. BLOWOUT GRASS. (Fig. 236.) Culms tough, 60 to 100 cm. tall, the rhizomes long, slender; blades glabrous, involute, elongate, flexuous, tapering to a fine point; panicle oblong, one-third to half the entire length of the culm; spikelets 5 to 7 mm. long, broadly V-shaped, the glumes acuminate, about half as long as the spikelet; lemmas acute, sometimes mucronate, 4 to 5 mm. long. 24 —Sand hills, North Dakota to Oklahoma, west to Utah and Arizona (Moki Reservation). A sand-binding grass.



FIGURE 235.—*Dissanthelium californicum*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 10$. (Trask 324, Calif.)



FIGURE 236.—*Redfieldia flexuosa*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Over 2429, S. Dak.)

20. *MONANTHÓCHLOË* Engelm.

Plants dioecious; spikelets 3- to 5-flowered, the uppermost florets rudimentary, the rachilla disarticulating tardily in pistillate spikelets; glumes wanting; lemmas rounded on the back, convolute, narrowed above, several-nerved, those of the pistillate spikelets like the blades in texture; palea narrow, 2-nerved, in the pistillate spikelets convolute around the pistil, the rudimentary uppermost floret enclosed between the keels of the floret next below. Creeping wiry perennial, with clustered short subulate blades, the spikelets inconspicuous at the ends of the short

branches, only a little exceeding the leaves. Type species, *Monanthochloë littoralis*. Name from Greek *monos*, single, *anthos*, flower, and *chloe*, grass, alluding to the unisexual flowers.

1. *Monanthochloë littoralis* Engelm. (Fig. 237.) Culms tufted, extensively creeping, the short branches erect; blades falcate, mostly less than 1 cm. long, conspicuously distichous in distant to approximate clusters; spikelets 1 to few, nearly concealed in the leaves. ♀ —Muddy seashores and tidal flats, southern Florida, especially on the keys; Texas (Galveston and southward); southern California (Santa Barbara and southward); Mexico, Cuba.

21. *DISTICHLIS* Raf. SALTGRASS.

Plants dioecious; spikelets several to many-flowered, the rachilla of the pistillate spikelets disarticulating above the glumes and between the florets; glumes unequal, broad, acute, keeled, 3- to 7-nerved, the lateral nerves sometimes faint; lemmas closely imbricate, firm, the pistillate coriaceous, acute or subacute, with 9 to 11 mostly faint nerves (nerves fewer in *D. texana*); palea as long as the lemma or shorter, the margins bowed out near the base, the pistillate coriaceous, enclosing the grain. Low perennials, with extensively creeping scaly rhizomes, sometimes stolons, erect, rather rigid culms, and dense, rather few-flowered panicles. Type species, *Distichlis spicata*. Name from Greek *distichos*, 2-ranked, alluding to the distichous leaves.

The species of *Distichlis* in general have little value for forage, but in the interior basins, such as the vicinity of Great Salt Lake, *D. stricta* is grazed when better grasses are not available.

Plants mostly more than 30 cm. tall; blades not conspicuously distichous, mostly 20 to 40 cm. long; panicle more than 10 cm. long; stolons present, long and stout..... 3. *D. TEXANA*.

Plants mostly less than 30 cm. tall; blades conspicuously distichous, mostly less than 10 cm. long; panicle rarely more than 5 cm. long.

Panicles condensed, the spikelets imbricate, mostly 5- to 9-flowered; keels of pistillate paleas with narrow entire wings..... 1. *D. SPICATA*.

Panicles looser, the spikelets less imbricate, the individual spikelets plainly visible; keels of pistillate paleas with broader serrate-erose wings..... 2. *D. STRICTA*.

1. *Distichlis spicata* (L.) Greene.

SEASHORE SALTGRASS. (Fig. 238.)

Culms 10 to 40 cm. tall, sometimes taller; leaves numerous, the sheaths closely overlapping, the spreading blades conspicuously distichous, flat to involute, sharp-pointed, mostly less than 10 cm. long; panicle usually pale or greenish, 1 to 6 cm. long, rarely longer; spikelets mostly 5- to 9-flowered, mostly 6 to 10 mm. long,

compressed; lemmas 3 to 6 mm. long, the pistillate more coriaceous and more closely imbricate than the staminate; palea rather soft, narrow, the keels narrowly winged, entire; anthers about 2 mm. long. ♀ — Seashores, forming dense colonies, Nova Scotia to Florida and Texas; British Columbia to California, Mexico, and Cuba; Pacific slope of South



FIGURE 237.—*Monanthochloë littoralis*. Plant, $\times \frac{1}{2}$; pistillate spikelet and floret, $\times 5$. (Hitchcock 623, Fla.)

America. Occasional plants produce runners above ground as well as below. Such specimens have been segregated as *D. spicata* var. *stolonifera* Beetle. *DISTICHLIS SPICATA* var. *NANA* Beetle. Culms slender from slender rhizomes; blades 1 to 8 cm. long, subinvolute, slender; panicles of 2 to 5 spikelets, the spikelets slightly narrower than in the species; keels of the palea densely short-ciliate. ♀ —Alkaline boggy or sandy soil, Stanislaus and Kern Counties, Calif. Insufficiently known.

2. *Distichlis stricta* (Torr.) Rydb. DESERT SALTGRASS. (Fig. 239.) Resembling *D. spicata*; panicles less congested, the individual spikelets easily distinguished; staminate panicles stramineous, the spikelets 8- to 15-flowered; pistillate spikelets greenish leaden, mostly 7- or 9-flowered, broader; lemmas firm, the palea a little shorter, much broader below, the keels with wide serrulate erose or lacerate wings. ♀ (*D. dentata* Rydb., the pistillate plant.) — Alkaline soil of the interior, Saskatchewan to eastern Washington, south to Texas and California; Mexico. This and *D. spicata* appear to be distinct for the most part, but the staminate plants are sometimes difficult to distinguish.¹⁰

3. *Distichlis texana* (Vasey) Scribn. (Fig. 240.) Culms erect from a decumbent base, 30 to 60 cm. tall, producing extensively creeping rhizomes and long stout stolons; blades flat, firm, glabrous beneath, scabrous on the upper surface, mostly 20 to 40 cm. long, 2 to 6 mm. wide; panicle narrow, pale, 10 to 25 cm. long, somewhat interrupted, the branches appressed; spikelets somewhat compressed, 4- to 8-flowered, 1 to 1.5 cm. long; glumes 5 and 7 mm. long, acute; lemmas of pistillate spikelets closely imbricate and appressed, about 8 mm. long with 3

strong nerves, the intermediate nerves obscure, acute, the margins broad, hyaline; palea of pistillate spikelets shorter than the lemma, strongly bowed out below, closely convolute around the pistil, the keels with narrow erose or toothed wings; lemmas of staminate spikelets more spreading, about 6 mm. long, 3-nerved; palea about as long as the



FIGURE 238.—*Distichlis spicata*. Plant, $\times 1$; floret, $\times 5$. (Hitchcock 2826, Oreg.)

lemma, not bowed out, not convolute, the keels minutely scabrous, not winged; anthers 3 mm. long. ♀ —Sand flats, Presidio and Brewster Counties, Tex., and northern Mexico.

¹⁰ REEDER, J. R. STATUS OF *DISTICHLIS DENTATA*. Torrey Bot. Club Bul. 70: 53-57. 1943.



FIGURE 239.—*Distichlis stricta*. Staminate plant, $\times \frac{1}{2}$; staminate spikelet and floret, $\times 5$ (Mearns 3132, Calif.); pistillate panicle, $\times 1$; pistillate floret, $\times 5$ (Sandberg and Leiberg 463, Wash.).

22. UNIOLA L.

Spikelets 3- to many-flowered, the lower 1 to 6 lemmas empty, the rachilla disarticulating above the glumes and between the florets; glumes compressed-keeled, rigid, usually narrow, 3- to 7-nerved, acute or acuminate, rarely mucro-

nate; lemmas compressed, sometimes conspicuously flattened, chartaceous, many-nerved, the nerves sometimes obscure, acute or acuminate, the empty ones at the base and the uppermost usually reduced; palea rigid, strongly keeled, bowed out at base, weakly so in *Uniola paniculata*; stamen 1. Rather tall, erect perennials, with flat or sometimes convolute blades and narrow or open panicles of compressed, sometimes very broad and flat spikelets. Type species, *Uniola paniculata*. Ancient Latin name of a plant.

The inland species are not abundant enough to be of value for forage. *Uniola latifolia* is worthy of cultivation as an ornamental; *U. paniculata* is a sand binder along the southern seacoast; the seeds of *U. palmeri* Vasey of Mexico are used for food by the Cocopa Indians.

Rhizomes extensively creeping; blades firm, flat at base, tapering into a long flexuous involute point; empty lemmas about 4; coastal dunes..... 1. *U. PANICULATA*. Rhizomes wanting or short and knotty; blades thin, flat; empty lemma 1 (2 or 3 in *U. ornithorhyncha*); rich or moist woods.

Spikelets 8- to 12-flowered on slender pedicels; panicle nodding or drooping.

2. *U. LATIFOLIA*.

Spikelets 3- to 7-flowered, nearly sessile; panicle erect, nearly simple, the branches stiff.

Spikelets more than 10 mm. (usually more than 12 mm.) wide, with 5 to 7 fertile florets.

Sterile lemma 1; panicle 10 to 15 cm. long, the lower branches with 2 to 5 rather distant spikelets..... 3. *U. NITIDA*.

Sterile lemmas 2 or 3; panicle 3 to 8 cm. long, the branches very short with approximate spikelets..... 4. *U. ORNITHORHYNCHA*.

Spikelets rarely as much as 8 mm. wide at maturity, V-shaped, with 1 to 4 fertile florets (rarely more), and 1 sterile lemma.

Collar of sheath pubescent, the sheaths commonly loosely long-pubescent, rarely glabrous..... 5. *U. SESSILIFLORA*.

Collar and sheaths glabrous or nearly so 6. *U. LAXA*.

1. *Uniola paniculata* L. SEA OATS.

(Fig. 241.) Culms stout, about 1 m. tall, from extensively creeping rhizomes; blades flat, firm, elongate,



FIGURE 240.—*Distichlis texana*. Panicle, $\times 1$; lemma and palea, $\times 5$. (Nealley, Tex.)

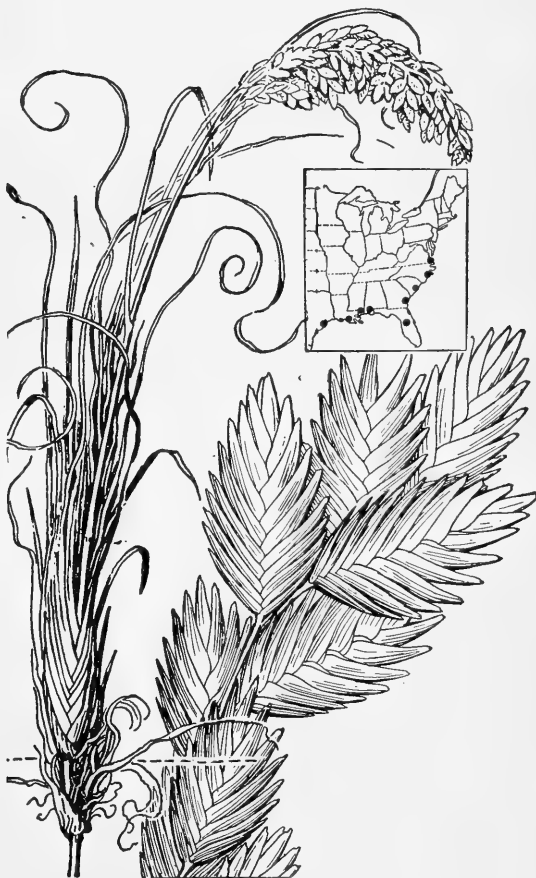


FIGURE 241.—*Uniola paniculata*. Plant, $\times 1/10$; spikelets, $\times 1$. (Kearney 2134, Va.)



FIGURE 242.—*Uniola latifolia*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 3$. (Chase 5874, Md.)

becoming involute toward the long, fine flexuous point; panicle pale, narrow, condensed, heavy and nodding, 20 to 40 cm. long, the branches arching and drooping, as much as 12 cm. long; spikelets very flat, 10- to 20-flowered, mostly 2 to 2.5 cm. long, 1 cm. wide, the first 4 to 6 lemmas empty, the slender pedicels shorter than the spikelets; lemmas about 9-nerved, strongly compressed-keeled about 1 cm. long, acute; palea acute, as long as the lemma, the strong wings of the keels ciliate. 2 — Sand dunes of the seacoast, Northampton County, Va., to Florida and Texas; northern West Indies; eastern Mexico. Spikelets apparently sterile, no caryopses nor stamens found.

2. *Uniola latifolia* Michx. BROAD-LEAF UNIOLA. (Fig. 242.) Culms 1 to 1.4 m. tall, with short strong rhizomes, forming colonies; blades flat, narrowly lanceolate, 10 to 20 cm. long, mostly 1 to 2 cm. wide; panicle open, drooping, 10 to 20 cm. long, the branches bearing a few large, very flat spikelets, the pedicels capillary; spikelets 8- to 12-flowered, 2 to 3.5 cm. long, 1 to 1.5 cm. wide, green or finally tawny, the first lemma empty; lemmas lanceolate, strongly compressed-keeled, acute, about 1 cm. long, striate-nerved, the keel ciliate with soft ascending hairs, the callus pilose; palea shorter than the lemma, wing-keeled; anther minute, the flower cleistogamous; caryopsis flat, oval, black, 5 mm. long. 2 — Rich woods, Pennsylvania and New Jersey to Illinois and Kansas, south to Florida and Texas; Arizona (Pinal County).

3. *Uniola nitida* Baldw. (Fig. 243.) Culms slender, 50 to 75 cm. tall, erect, loosely tufted, with short rhizomes; blades flat, spreading, mostly less than 15 cm. long, 4 to 8 mm. wide; panicle open, few-flowered, 10 to 15 cm. long, with a few spreading branches 3 to 8 cm. long, bearing 2 to 5 nearly sessile spikelets; spikelets 4- to 7-flowered, 1 to 1.5 cm. long,

about 1 cm. wide, the first lemma empty; lemmas spreading, 7 to 10 mm. long, compressed-keeled, gradually acuminate, striate-nerved; palea equaling the lemma, acuminate, 2-toothed, the keels prominently winged; anther 1.5 mm. long. 2 — Moist woods, South Carolina to Florida.

4. *Uniola ornithorhyncha* Steud. (Fig. 244.) Culms slender, 30 to 50 cm. tall, loosely tufted with short rhizomes; sheaths pubescent on the collar; blades flat, thin, mostly less than 15 cm. long, 3 to 6 mm. wide; panicle narrow, 3 to 9 cm. long, the short approximate branches with 1 to 3 nearly sessile spikelets or the lower somewhat distant with 4 to 6 spikelets, pubescent in the axils; spikelets very flat, with 3 or 4 widely spreading fertile florets, the 2 or 3 lower lemmas empty, appressed; fertile lemmas about 8 mm. long, narrow, gradually acuminate, striate-nerved; palea as long as or longer than the lemma, acuminate, 2-toothed, strongly bowed out below, the keels rather narrowly winged; anther 1 to 1.8 mm. long. 2 — Low woods or hummocks in swamps, Alabama to Louisiana.

5. *Uniola sessiliflora* Poir. (Fig. 245.) Culms erect, 0.5 to 1.5 m. tall, in loose tufts with short rhizomes; sheaths pilose, at least toward the summit; blades elongate, firm, mostly sparsely pilose on the upper surface toward the base, 5 to 10 mm. wide, tapering to base; panicle long-exserted, 20 to 50 cm. long, narrow, the branches distant, stiffly ascending or appressed, the lower as much as 7 cm. long, the upper short, somewhat capitate; spikelets nearly sessile, aggregate in clusters, flat, usually 3- to 5-flowered, broadly V-shaped at maturity, the first lemma empty; glumes about 2 mm. long; lemmas spreading, about 5 mm. long, acuminate, beaked, especially before maturity, striate-nerved; palea shorter than the lemma, acute, broad, the keels narrowly winged; grain black, 3 mm. long, at maturity spreading the lemma and



FIGURE 243.—*Uniola nitida*. Plant, $\times 1$; floret, $\times 5$. (Curtiss 3521, Fla.)

palea; anther 1.3 mm. long. $\text{\textcircled{2}}$ (*U. longifolia* Scribn.)—Rich woods, southeastern Virginia to Tennessee and Oklahoma, south to Florida and eastern Texas.

6. *Uniola láxa* (L.) B. S. P. (Fig. 246.) Culms slender, 60 to 100 cm. tall, erect to nodding from a loosely tufted sometimes knotty base; blades elongate, flat to sometimes loosely involute, 3 to 6 mm. wide; panicle narrow, slender, 15 to 30 cm. long, the branches short, appressed, approximate, the lower sometimes 3 cm. long and distant; spikelets nearly sessile, approximate, flat, usually 3- to 4-flowered, the first lemma empty; lemmas spreading, 4 to 5 mm. long, gradually acuminate, striate-nerved; palea broad, the keels narrowly winged; grain black, 2.5 mm. long, at maturity spreading the lemma and palea; anther 1.2 mm. long. $\text{\textcircled{2}}$ —Moist woods, Coastal Plain, Long Island to Florida and Texas, extending to western North Carolina, Kentucky, Arkansas, and Oklahoma.

23. *DÁCTYLIS* L. ORCHARD GRASS

Spikelets few-flowered, compressed, finally disarticulating between the

florets, nearly sessile in dense 1-sided fascicles, these borne at the ends of the few branches of a panicle; glumes unequal, carinate, acute, hispid-ciliate on the keel; lemmas compressed-keeled, mucronate, 5-nerved, ciliate on the keel. Perennials, with flat blades and fascicled spikelets. Type species, *Dactylis glomerata*. Name from Greek *dactulos*, a finger, alluding to the stiff branches of the panicle.

1. *Dactylis glomeráta* L. ORCHARD GRASS. (Fig. 247.) Culms in large tussocks, 60 to 120 cm. tall; blades elongate, 2 to 8 mm. wide; panicles 5 to 20 cm. long, the few distant stiff solitary branches ascending, or spreading at anthesis, appressed at maturity, the lowermost sometimes as much as 10 cm. long; lemmas about 8 mm. long, mucronate or short-awned. $\text{\textcircled{2}}$ —Fields, meadows, and waste places, Newfoundland to southeastern Alaska; south to Florida and central California; Eurasia. Commonly cultivated as a meadow and pasture grass. In England called cocksfoot. A variegated form (called by gardeners var. *variegata*) is occasionally cultivated for borders.

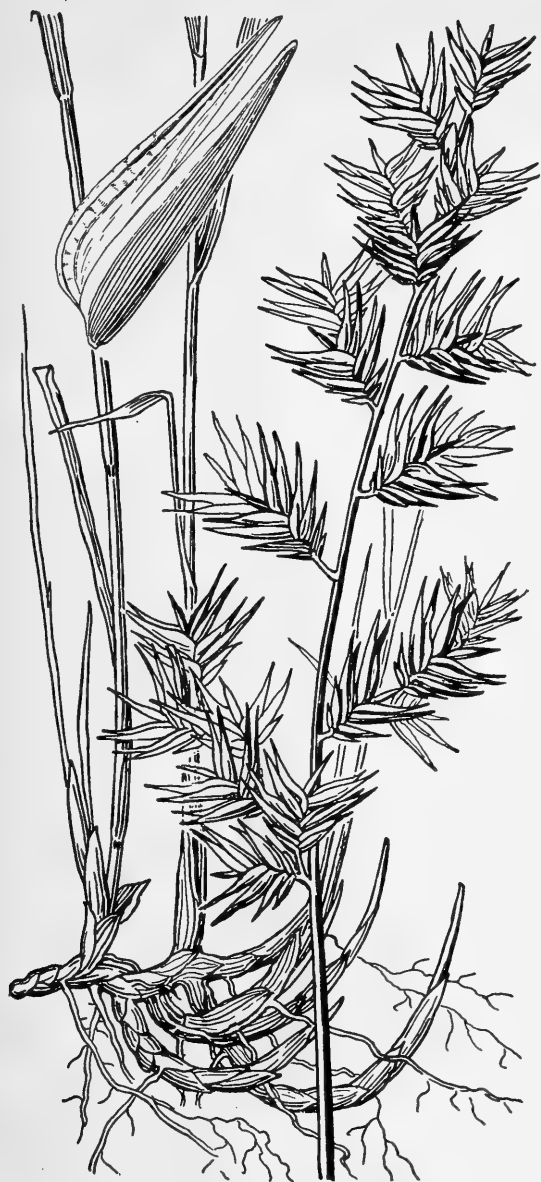


FIGURE 245.—*Uniola sessiliflora*. Plant, $\times 1$; floret, $\times 5$. (Tracy, Miss.)

FIGURE 244.—*Uniola ornithorhyncha*. Plant, $\times 1$; floret, $\times 5$. (Tracy and Lloyd 448, Miss.)

24. CYNOSÚRUS L. DOGTAIL

Spikelets of two kinds, sterile and fertile together, the fertile sessile, nearly covered by the short-pediceled sterile one, these pairs imbricate in a dense 1-sided spikelike panicle; sterile spikelets consisting of 2 glumes and several narrow, acuminate, 1-nerved lemmas on a continuous rachilla; fertile spikelets 2- or 3-flowered, the glumes narrow, the lemmas broader, rounded on the back, awn-tipped, the rachilla disarticulating above the glumes. Annuals or perennials with narrow flat blades and dense spikelike or subcapitate panicles. Type species, *Cynosurus cristatus*. Name from Greek *kuon* (*kun-*) dog, and *oura*, tail.

Plants perennial; panicles narrow, spikelike; awns inconspicuous..... 1. *C. CRISTATUS*.
Plants annual; panicles subcapitate; awns conspicuous..... 2. *C. ECHINATUS*.

1. *Cynosurus cristatus* L. CRESTED DOGTAIL. (Fig. 248.) Perennial; culms tufted or geniculate at base, erect, 30

to 60 cm. tall; panicle spikelike, linear, more or less curved, 3 to 8 cm.



FIGURE 246.—*Uniola laxa*. Plant, $\times 1$; floret, $\times 5$. (Van Eseltine and Moseley 178, D. C.)

long; pairs of spikelets about 5 mm. long; lemmas with awns mostly not more than 1 mm. long. ☉ —Fields and waste places, Newfoundland to Michigan and North Carolina; Idaho, Washington to California; introduced from Europe. Occasionally cultivated in mixtures for meadows, but of little value.

2. *Cynosurus echinatus* L. (Fig. 249.) Annual; culms 20 to 40 cm. tall; blades short; panicle subcapitate, 1 to 4 cm. long, bristly; pairs of spikelets 7 to 10 mm. long; lemmas with awns 5 to 10 mm. long. ☉ —Open ground, British Columbia; Oregon to central California; Maryland; North Carolina; Arkansas and Oklahoma; introduced from Europe.

25. *LAMÁRCKIA* Moench

(*Achyrodes* Boehmer)

Spikelets of two kinds, in fascicles, the terminal one of each fascicle fertile, the others sterile; fertile spikelet with 1 perfect floret on a slender stipe and a rudimentary floret on a long rachilla-joint, both awned, the glumes narrow, acuminate or short-awned, 1-nerved; lemma broader, scarcely nerved, bearing just below the apex a delicate awn; sterile spikelets linear, 1 to 3 in each fascicle, consisting of 2

glumes similar to those of the fertile spikelet, and numerous imbricate, obtuse, awnless, empty lemmas, a reduced spikelet similar to the fertile one borne on the pedicel with one of the sterile ones.—Low annual with flat blades and oblong, 1-sided, dense panicles, the crowded fascicles drooping, the fertile being hidden, except the awns, by the numerous sterile ones; fascicles falling entire. Type species, *Lamarckia aurea*. Named for J. B. Lamarck.

1. *Lamarckia aurea* (L.) Moench. GOLDENTOP. (Fig. 250.) Culms erect or decumbent at base, 10 to 40 cm. tall; blades soft, 3 to 7 mm. wide; panicle dense, 2 to 7 cm. long, 1 to 2 cm. wide, shining, golden yellow to purplish, the branches short, erect, the branchlets capillary, flexuous; pedicels fascicled, pubescent, with a tuft of long whitish hairs at the base; fertile spikelet about 2 mm. long, the awn of lemma about twice as long as the spikelet; sterile spikelet 6 to 8 mm. long. ☉ —Open ground and waste places, Texas, Arizona, southern California, and northern Mexico; introduced from the Mediterranean region. Sometimes cultivated for ornament.

26. *ARÚNDO* L.

Spikelets several-flowered, the florets successively smaller, the summits of all about equal, the rachilla glabrous, disarticulating above the glumes and between the florets; glumes somewhat unequal, membranaceous, 3-nerved, narrow, tapering into a slender point, about as long as the spikelet; lemmas thin, 3-nerved, densely and softly long-pilose, gradually narrowed at the summit, the nerves ending in slender teeth, the middle one extending into a straight awn. Tall perennial reeds, with broad linear blades and large plumelike terminal panicles. Type species, *Arundo donax*. *Arundo*, the ancient Latin name.

1. *Arundo donax* L. GIANT REED. (Fig. 251.) Culms stout, in large



FIGURE 247.—*Dactylis glomerata*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Wilson 1334, Conn.)



FIGURE 248.—*Cynosurus cristatus*. Plant, $\times \frac{1}{2}$; fertile spikelet and floret, $\times 5$. (Waghorne 23, Newf.)

clumps, 2 to 6 m. tall, sparingly branching, from thick knotty rhizomes; blades numerous, elongate, 5 to 7 cm. wide on the main culm, conspicuously distichous, spaced rather

evenly along the culm, the margin scabrous; panicle dense, erect, 30 to 60 cm. long; spikelets 12 mm. long.

24 —Along irrigation ditches, Arkansas and Texas to southern California, occasionally established eastward from Maryland south; tropical America; introduced from the warm regions of the Old World. Frequently cultivated for ornament, including var. *VERSICOLOR* (Miller) Stokes, with white-striped blades. In the South-



FIGURE 249.—*Cynosurus echinatus*. Panicle, $\times 1$; fertile floret, $\times 5$. (Macoun 80976, Vancouver Island.)

west the culms are used for lattices, mats, and screens, and in the construction of adobe huts. In Europe the culms are used for making the reeds of clarinets and organ pipes. If kept cut down the culms branch; in this form used for hedges. Planted in southeastern Texas to prevent wind erosion.

GYNÉRIUM Willd. ex Beauv.

Plants dioecious; spikelets several-flowered, the pistillate with long-attenuate glumes and smaller long-silky lemmas, the staminate with shorter glumes and glabrous lemmas.



FIGURE 250.—*Lamarchia aurea*. Plant, $\times \frac{1}{2}$; fertile spikelet and floret, $\times 5$. (Baker 5275, Calif.)

Tall perennial reeds with plumelike panicles. Type species, *Gynerium saccharoides* (*G. sagittatum*). Name from Greek *gune*, female, and *erion*, wool, referring to the woolly pistillate spikelets.

Gynerium sagittatum (Aubl.) Beauv. UVA GRASS. Culms as much as

10 or 12 m. tall, clothed below with the overlapping old sheaths, the blades fallen; blades sharply serrulate, commonly 2 m. long, 4 to 6 cm. wide, forming a great fan-shaped summit to the sterile culms, panicle pale, plumelike, densely flowered, 1 m. or more long, the main axis erect, the branches



FIGURE 251.—*Arundo donax*. Plant, $\times 1/3$; spikelet and floret, $\times 3$. (Biltmore Herb. 7514, N. C.)

drooping. 2 —Occasionally cultivated for ornament in greenhouses. River banks and wet ground, tropical America; soil binder.

27. CORTADERIA Stapf

PAMPASGRASS

Spikelets several-flowered; rachilla internodes jointed, the lower part glabrous, the upper bearded, forming a stipe to the floret; glumes longer than the lower florets; lemmas of pistillate spikelets clothed with long hairs. Large tussock grasses, with

pery, long, slender; lemmas bearing a long slender awn. 2 (*Gynerium argenteum* Nees.)—Plains and open slopes, Brazil to Argentina and Chile. Cultivated as a lawn ornamental in the warmer parts of the United States; in southern California grown commercially for the plumes which are used for decorative purposes, the culms here being sometimes as much as 7 m. tall. Recently planted by Soil Conservation Service for supplementary dry-land pasture in Ventura and Los Angeles Counties, Calif., cattle reported to be thriving on it.



FIGURE 252.—*Cortaderia selloana*. Pistillate (♀) and staminate (♂) panicles, X 1. (Silveus 308, Tex.)

leaves crowded at the base, the blades elongate, narrow, attenuate, the margins usually serrulate; panicle large, plumelike. Type species, *Cortaderia argentea* (*C. selloana*). Name from the Argentine native name *cortadera*, cutting, because of the cutting edges of the blades.

1. *Cortaderia selloana* (Schult.) Aschers. and Graebn. PAMPASGRASS. (Fig. 252.) Dioecious perennial reed, in large bunches; culms stout, erect 2 to 3 or more m. tall; panicle feathery, silvery white to pink, 30 to 100 cm. long; spikelets 2- to 3-flowered, the pistillate silky with long hairs, the staminate naked; glumes white, pa-

CORTADERIA RUDIÚSCULA Stapf. Differing from *C. selloana* in the looser yellowish or purplish panicle; spikelets somewhat smaller. 2 —Occasionally cultivated for ornament; Argentina. Has been called *C. quila* Stapf, but that name is ultimately based on *Arundo quila* Molina, which is a bamboo, *Chusquea quila* (Molina) Kunth.

Ampelodésmos mauritánicus (Poir.) Dur. and Schinz. Robust perennial in large clumps, culms solid, 2 to 3 m. tall; blades elongate, wiry, curved at base, bending forward across the culm, the upper surface downward; panicle 20 to 50 cm. long, many-flowered, the slender, flexuous, very

scabrous branches naked at base, drooping, the spikelets crowded toward the ends, 2- to 5-flowered, 12 to 15 mm. long, the lower part of lemma and rachilla joints densely pilose with white hairs. ♀ —Occasionally cultivated as an ornamental; escaped and established in Napa County, Calif. Mediterranean region. Generic name often incorrectly spelled *Ampelodesma*.

28. PHRAGMITES Trin.

Spikelets several-flowered, the rachilla clothed with long silky hairs, disarticulating above the glumes and at the base of each segment between the florets, the lowest floret staminate or neuter; glumes 3-nerved, or the upper 5-nerved, lanceolate, acute, unequal, the first about half as long as the upper, the second shorter than the florets; lemmas narrow, long-acuminate, glabrous, 3-nerved, the florets successively smaller, the summits of all about equal; palea much shorter than the lemma. Perennial reeds, with broad, flat, linear blades and large terminal panicles. Type species, *Arundo phragmites* L. (*Phragmites communis*). Name from the Greek, in reference to its growth like a fence (*phragma*) along streams.

1. *Phragmites communis* Trin. COMMON REED. (Fig. 253.) Culms erect, 2 to 4 m. tall, with stout creeping rhizomes and often also with stolons; blades flat, 1 to 5 cm. wide; panicle tawny or purplish, 15 to 40 cm. long, the branches ascending, rather densely flowered; spikelets 12 to 15 mm. long, the florets exceeded by the hairs of the rachilla. ♀ (*P. phragmites* Karst.)—Marshes, banks of lakes and streams, and around springs, Nova Scotia to British Columbia, south to Maryland, North Carolina, Illinois, Louisiana, and Cali-

fornia; Florida; Mexico and West Indies to Chile and Argentina; Eurasia, Africa, Australia.

In the Southwest this, in common with *Arundo donax*, is called by the Mexican name carrizo and is used for lattices in the construction of adobe huts. The stems were used by the Indians for shafts of arrows and in Mexico and Arizona for mats and screens, for thatching, cordage, and carrying nets.

29. NEYRAÚDIA Hook. f.

Spikelets 4- to 8-flowered; rachilla jointed about half way between the florets, the part below the joint glabrous, the part above bearded, forming a stipe below the mature floret; glumes unequal, 1-nerved; lemmas narrow, 3-nerved, acuminate, conspicuously long-pilose on the margins, awned from between 2 fine teeth, the awn recurved. Tall perennial with large open many-flowered panicles. Type species, *Neyraudia madagascariensis* (Kunth) Hook. f. (*N. arundinacea* (L.) Henr.) Name an anagram of *Reynaudia*, a genus of Cuban grasses.

1. *Neyraudia reynaudiána* (Kunth) Keng. (Fig. 254.) Reedlike perennial, 1 to 3 m. tall, resembling *Phragmites communis*; sheaths woolly at the throat and on the collar; blades flat, 1 to 2 cm. wide or sometimes narrow and subinvolute; panicle nodding, 30 to 60 cm. long, rather densely flowered; spikelets 4- to 8-flowered, the lowest 1 or 2 lemmas empty, 6 to 8 mm. long, rather short-pedicel along the numerous panicle branches; lemmas somewhat curved, slender, the awn flat, recurved. ♀ —Planted in testing garden at Coconut Grove, Fla., and occasionally escaped; native of southern Asia.

30. MÉLICA L. MELICGRASS

Spikelets 2- to several-flowered (rarely with 1 perfect floret), the rachilla disarticulating above the glumes and between the fertile florets (in some species spikelets falling entire), prolonged beyond the perfect florets and bearing 2 or 3 approximate gradually smaller empty lemmas, each enclosing the



FIGURE 253.—*Phragmites communis*. Plant, $\times 1/3$; spikelet and floret, $\times 3$. (Hitchcock 5078, N. Dak.)

one above; glumes somewhat unequal, thin, often papery, scarious-margined, obtuse or acute, sometimes nearly as long as the lower floret, 3- to 5-nerved, the nerves usually prominent; lemmas convex, several-nerved, membranaceous or rather firm, scarious-margined, sometimes conspicuously so, awnless or sometimes awned from between the teeth of the bifid apex, the callus not bearded. Rather tall perennials, the base of the culm often swollen into a corm, with closed sheaths, usually flat blades, narrow or sometimes open, usually simple panicles of relatively large spikelets. Type species, *Melica nutans* L. *Melica*, an Italian name for a kind of sorghum, probably from the sweet juice (mel, honey).

The species are in general palatable grasses but, not being gregarious, do not furnish much forage. Important species are *M. porteri*, *M. imperfecta*, and *M. subulata*.

Spikelets narrow; lemmas acute (obtuse in *M. harfordii*) or awned.

SECTION 1. BROMELICA.

Spikelets broad; lemmas obtuse, awnless..... SECTION 2. EUMELICA.

Section 1. Bromelica

Lemmas long-awned from a bifid apex.

Branches of panicle few, distant, spreading, naked on the lower half..... 1. *M. SMITHII*.

Branches of panicle short, appressed, spikelet-bearing from near the base.

2. *M. ARISTATA*.

Lemmas awnless or minutely awned.

Culms not bulbous at base; lemmas obtuse, mucronate or awn-tipped. 3. *M. HARFORDII*.

Culms bulbous at base; lemmas acute or acuminate.

Lemmas acuminate, usually pilose; panicle narrow, the branches short, usually appressed..... 4. *M. SUBULATA*.

Lemmas acute; panicle broad, the branches long and spreading..... 5. *M. GEYERI*.

Section 2. Eumelica

1a. Culms bulbous at base (see also *M. californica*).

Pedicels capillary, flexuous or recurved; panicle narrow..... 6. *M. SPECTABILIS*.

Pedicels stouter, appressed.

Rachilla soft, enlarged, wrinkled in drying, usually brownish..... 8. *M. FUGAX*.

Rachilla firm, whitish, not wrinkled.

Panicle rather dense, the branches short, appressed, usually imbricate; glumes thin, indistinctly nerved..... 7. *M. BULBOSA*.

Panicle loosely flowered, the branches, or some of them, stiffly ascending-spreading in anthesis, usually somewhat distant, scarcely imbricate; glumes firm, distinctly nerved..... 9. *M. INFLATA*.

1b. Culms not distinctly bulbous at base (somewhat swollen in *M. californica*.)

2a. Spikelets falling entire, nodding to pendulous on capillary pedicels.

Spikelets 4- or 5-flowered, reflexed; panicle narrow (open in *M. porteri* var. *laxa*).

Spikelets V-shaped; glumes 10 to 15 mm. long..... 10. *M. STRICTA*.

Spikelets narrow; glumes not more than 7 mm. long..... 11. *M. PORTERI*.

Spikelets 1- to 3-flowered, nodding; panicle open, the lower branches spreading.

Spikelets with 1 perfect floret; lemma with a few flat, twisted golden hairs on the back about the middle..... 14. *M. MONTEZUMAE*.

Spikelets with 2 perfect florets, lemmas without hairs.

Glumes nearly as long as the usually 2-flowered spikelet; apexes of the 2 florets about the same height; panicle simple or nearly so..... 12. *M. MUTICA*.

Glumes shorter than the usually 3-flowered spikelet; apex of second floret a little higher than that of the first; panicle compound..... 13. *M. NITENS*.

2b. Spikelets not falling entire, not pendulous.

Spikelets 4 to 6 mm. long; fertile florets 1 or 2.

Fertile lemmas pubescent; fertile florets often 2..... 15. *M. TORREYANA*.

Fertile lemmas glabrous; fertile floret usually 1..... 16. *M. IMPERFECTA*.

Spikelets 8 to 15 mm. long; fertile florets 2 to several.

Spikelets silvery white; glumes about as long as the spikelet; plant tall, somewhat woody..... 17. *M. FRUTESCENS*.

Spikelets tawny to purplish; glumes shorter than the spikelet; plant lower, herbaceous..... 18. *M. CALIFORNICA*.

SECTION 1. BROMÉLICA Thurb.

Spikelets narrow; glumes usually narrow, scarious-margined (papery in *M. geyeri*); sterile lemmas similar to the acute (obtuse in *M. harfordii*) or awned fertile lemmas.

1. *Melica smithii* (Porter) Vasey.
SMITH MELIC. (Fig. 255.) Culms slender, 60 to 120 cm. tall; sheaths retrorsely scabrous; blades lax, scabrous, 10 to 20 cm. long, 6 to 12 mm. wide; panicle 12 to 25 cm. long, the branches solitary, distant, spreading, naked below, sometimes reflexed, as much as 10 cm. long; spikelets 3- to 6-flowered, 18 to 20 mm. long,

sometimes purplish; glumes acute; lemmas about 10 mm. long, with an awn 3 to 5 mm. long. 2l (*Avena smithii* Porter.)—Moist woodlands, western Ontario and northern Michigan to British Columbia, south to

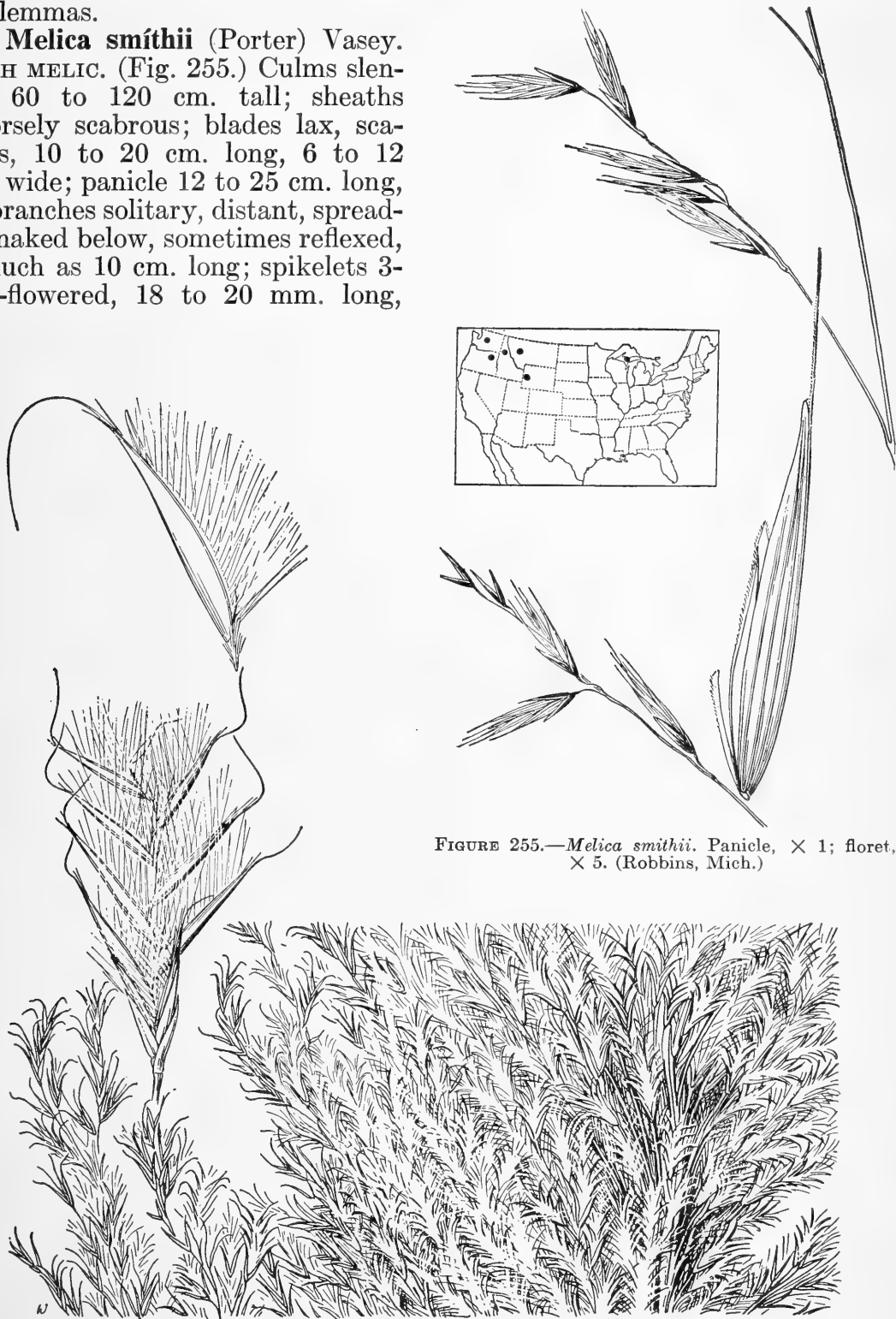


FIGURE 255.—*Melica smithii*. Panicle, $\times 1$; floret, $\times 5$. (Robbins, Mich.)

FIGURE 254.—*Neyraudia reynaudiana*. Panicle, $\times 1$; spikelet, $\times 5$; floret, $\times 10$. (Moldenke 432, Fla.)



FIGURE 256.—*Melica aristata*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Cusick 2888, Oreg.)

Wyoming (Teton Mountains) and Oregon (Wallowa Mountains).

2. *Melica aristata* Thurb. ex Bolland. (Fig. 256.) Culms erect or de-

cumbent below, 60 to 100 cm. tall; sheaths scabrous to pubescent; blades 3 to 5 mm. wide, more or less pubescent; panicle narrow, 10 to 15 cm. long, the branches short, mostly appressed or ascending; spikelets, excluding awns, about 15 mm. long; glumes 10 to 12 mm. long; lemmas 7-nerved, scabrous, awned, the awn 6 to 10 mm. long. 2♂ —Dry woods, meadows, and open slopes, Montana and Washington to the central Sierras of California.

3. *Melica harfordii* Boland. HARFORD MELIC. (Fig. 257.) Culms tufted,



FIGURE 257.—*Melica harfordii*. Panicle, $\times 1$; floret, $\times 5$. (Yates 457, Calif.)

60 to 120 cm. tall, often decumbent below; sheaths scabrous to villous; blades scabrous, firm, flat to sub-involute, 1 to 4 mm. wide; panicle narrow, 10 to 15 cm. long, the



FIGURE 258.—*Melica subulata*. Panicle, $\times 1$; floret, $\times 5$. (Hitchcock 11631, Wash.)

branches appressed; spikelets 1 to 1.5 cm. long, short-pediceled; glumes 7 to 9 mm. long, obtuse; lemmas rather faintly 7-nerved, hispidulous below, pilose on the lower part of the margin, the apex emarginate, mucronate, or with an awn less than 2 mm. long. 2♂ —Open dry woods and slopes, British Columbia to the Cascade Mountains of Oregon, south to Monterey County and Yosemite National Park, Calif. A smaller form with narrow involute blades has been segregated as *M. harfordii* var. *minor* Vasey.

4. *Melica subulata* (Griseb.) Scribn. ALASKA ONIONGRASS. (Fig. 258.) Culms 60 to 125 cm. tall, mostly bulbous at base; sheaths retrorsely scabrous, often pilose; blades thin,



FIGURE 259.—*Melica geyeri*. Plant, $\times 1$; floret, $\times 5$.
(Heller 11932, Calif.)

usually 2 to 5 mm. wide, sometimes wider; panicle usually narrow, mostly 10 to 20 cm. long, the branches appressed or sometimes spreading; spikelets narrow, 1.5 to 2 cm. long, loosely flowered; glumes narrow, obscurely nerved, the second about 8 mm. long; lemmas prominently 7-nerved, tapering to an acuminate point, awnless, the nerves more or less pilose-ciliate. ♀ —Meadows, banks, and shady slopes, western Wyoming and Montana to Alaska, south in the mountains to Mount Tamalpais and Lake Tahoe, Calif.

5. *Melica geyeri* Munro. GEYER ONIONGRASS. (Fig. 259.) Culms 1 to 1.5 m. tall, bulbous at base; sheaths usually glabrous, sometimes slightly scabrous or pubescent; blades scabrous (rarely puberulent), mostly less than 5 mm. wide; panicle 10 to 20 cm. long, open, the branches slender, rather distant, spreading, bearing a few spikelets above the middle; spikelets 12 to 20 mm. long; glumes broad, smooth, papery, the second about 6 mm. long; lemmas 7-nerved, scabrous or nearly glabrous, narrowed to an obtuse point, awnless. ♀ —Open dry woods and rocky slopes, at medium altitudes, western Oregon to central California in the Coast Range; infrequent in the Sierras to Placer County; Nevada; Yellowstone Park, Wyo.

MELICA GEYERI var. *ARISTULÁTA* J. T. Howell. Lemma with an awn 0.5 to 2 mm. long from a toothed apex. ♀ —Known only from Marin County, Calif.

SECTION 2. *EUMÉLICA* Aschers.

Spikelets broad; glumes broad, papery; lemmas awnless; sterile lemmas small, aggregate in a rudiment more or less hidden in the upper fertile lemmas.

6. *Melica spectabilis* Scribn. PURPLE ONIONGRASS. (Fig. 260.) Culms 30 to 100 cm. tall, bulbous at base, rarely with a short rhizome; sheaths pubescent; blades flat to subinvolute, 2 to 4 mm. wide; panicle mostly 10 to 15 cm. long, narrow, the branches appressed; spikelets purple-tinged, rather turgid, 10 to 15 mm. long, the pedicels capillary, flexuous; glumes broad, papery; lemmas strongly 7-nerved, obtuse, scarious-margined, imbricate. ♀ —Rocky or open woods and thickets, Montana to British Columbia, south to Colorado and northern California.

7. *Melica bulbósa* Geyer ex Port. and Coult. ONIONGRASS. (Fig. 261.) Culms 30 to 60 cm. tall, bulbous at base, resembling *M. spectabilis*; sheaths and blades flat to involute, 2

to 4 mm. wide, glabrous, scabrous, or pubescent; panicle narrow, rather densely flowered, the branches short, appressed, rather stiff, mostly imbricate; spikelets papery with age, mostly 7 to 15 mm. long, the short pedicels stiff, erect; lemmas obscurely nerved, obtuse or slightly emarginate.

♂ (*M. bella* Piper.)—Rocky woods and hills, Montana to British Columbia, south to Colorado and California; western Texas (Jeff Davis County). Specimens with pubescent foliage have been differentiated as *M. bella intonsa* Piper.

8. *Melica fúgax* Boland. LITTLE ONIONGRASS. (Fig. 262.) Culms mostly 20 to 60 cm. tall, in loose tufts, the bulbs prominent; sheaths retrorsely scabrous; blades 1.5 to 4 mm. wide, scabrous, usually pubescent on the upper surface; panicle 8 to 15 cm. long, the branches stiffly spreading or



FIGURE 260.—*Melica spectabilis*. Plant, $\times 1$; floret, $\times 5$. (Tweedy 85, Wyo.)



FIGURE 261.—*Melica bulbosa*. Plant, $\times 1$; floret, $\times 5$. (Tidestrom 1252, Utah.)

reflexed at anthesis, the lower 2 to 4 cm. long; spikelets 8 to 14 mm. long, the florets somewhat distant, usually purple-tinged, the rachilla soft, wrinkled in drying, often brownish; second glume nearly as long as the lower lemma; lemmas obscurely nerved, obtuse or emarginate. ♂ —Dry hills and open woods, Washington to Nevada and central California.

9. *Melica infláta* (Boland.) Vasey. (Fig. 263.) Culms 60 to 100 cm. tall, bulbous at base; sheaths glabrous or pubescent; blades flat, 2 to 4 mm.

10. *Melica stricta* Boland. Rock MELIC. (Fig. 264.) Culms 15 to 60 cm. tall, densely tufted, the base somewhat thickened but not bulbous; sheaths scaberulous, sometimes pu-



FIGURE 262.—*Melica fugax*. Plant, $\times 1$; floret, $\times 5$. (Vasey 9, Wash.)

wide; panicle 15 to 20 cm. long, narrow, the rather distant branches, or some of them, stiffly ascending-spreading in anthesis, the lower as much as 5 cm. long; spikelets somewhat inflated, 12 to 20 mm. long, pale green; glumes scabrous on the strong nerves; lemmas strongly nerved, scabrous, acutish. 21 —California (Yosemite National Park and Mount Shasta), Washington (Chelan County, the sheaths and blades pubescent).



FIGURE 263.—*Melica inflata*. Plant, $\times 1$; floret, $\times 5$. (Hall and Babcock 3334, Calif.)



FIGURE 264.—*Melica stricta*. Plant, $\times 1$; floret, $\times 5$.
(Swallen 720, Calif.)

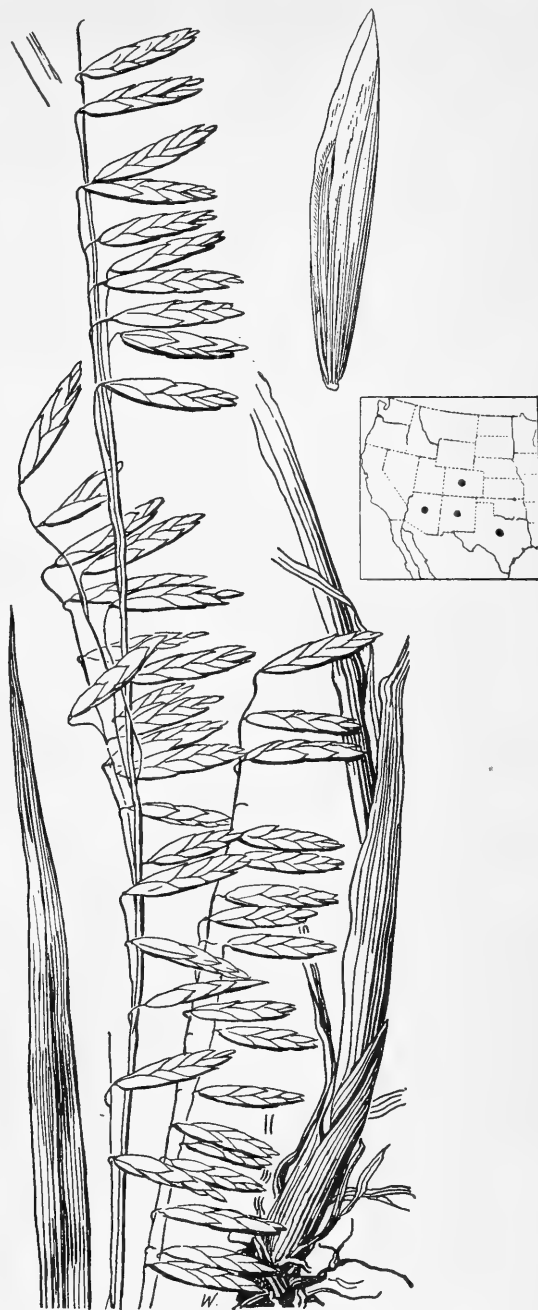


FIGURE 265.—*Melica porteri*. Plant, $\times 1$; floret, $\times 5$.
(Shear 726, Colo.)

bescent; blades mostly 1 to 3 mm. wide, scabrous, pubescent on the upper surface; panicle narrow, simple or with 1 or 2 short branches at base; spikelets 12 to 16 mm. long, 4- or 5-flowered, broadly V-shaped, reflexed on capillary pedicels, falling entire; glumes thin, shining, nearly as long as the spikelet; lemmas faintly nerved, scabrous, and obtuse. 2 — Rocky slopes and banks, at medium alti-



FIGURE 266.—*Melica mutica*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Chase 3695, Va.)



FIGURE 267.—*Melica nitens*. Plant, $\times 1$; floret, $\times 5$. (McDonald 15, Ill.)

tudes, Utah and Nevada to Oregon (Steins Mountains), the Sierras, and the mountains of southern California.

11. *Melica portéri* Scribn. PORTER MELIC. (Fig. 265.) Culms 50 to 100 cm. tall, tufted; sheaths smooth or scabrous; blades 2 to 5 mm. wide; panicle green or tawny, narrow, 1-sided, 15 to 20 cm. long, the branches short, appressed, few-flowered; spikelets 10 to 15 mm. long; 4- or 5-flowered, narrow, reflexed on capillary pubescent pedicels, falling entire; glumes half to two-thirds as long as the spikelet; lemmas with 5 strong nerves and several faint ones, scaberulous. 2 —Canyons, open woods, and moist places, mostly at 2,000 to 3,000 m., Colorado and Texas to Arizona; Mexico.

MELICA PORTERI var. **LÁXA** Boyle. Panicles open, the branches 4 to 9 cm. long, spreading to ascending, the glumes often purplish. 2 —Rocky slopes, Chisos Mountains, Tex., to Arizona. Resembles *M. nitens*, but blades narrower, spikelets 4- or 5-flowered, and rudiment slender.

12. *Melica mítica* Walt. TWO-FLOWER MELIC. (Fig. 266.) Culms 60 to 100 cm. tall, erect, loosely tufted; sheaths scabrous or somewhat pubescent; blades flat, 2 to 5 mm. wide; panicle 10 to 20 cm. long, nearly simple, with 1 to few short, spreading,

few-flowered branches below; spikelets broad, pale, 7 to 10 mm. long, usually 2-flowered, the florets spreading, pendulous on slender pedicels, pubescent at the summit, the spikelets falling entire; glumes nearly as long as the spikelet; lemmas scaberulous, strongly nerved, the two florets about the same height; rudiment obconic. 2 —Rich or rocky woods, Maryland to Iowa, south to Florida and Texas.

13. *Melica nitens* (Scribn.) Nutt. THREE-FLOWER MELIC. (Fig. 267.) Resembling *M. mutica*; on the average culms taller; sheaths glabrous or scabrous; blades 7 to 15 mm. wide; panicle more compound with several spreading branches; glumes shorter than the usually 3-flowered narrower spikelet; apex of the second floret a little higher than that of the first; lemmas acute; rudiment mostly minute. 2 —Rocky woods, Pennsylvania to Iowa and Kansas, south to Virginia, Arkansas, Oklahoma, and Texas.

14. *Melica montezúmae* Piper. (Fig. 268.) Culms 50 to 100 cm. tall, erect, tufted; sheaths scaberulous; ligule thin, 5 to 10 mm. long; blades flat or subinvolute, 2 to 3 mm. wide; panicle 10 to 20 cm. long, the branches simple or nearly so, distant, the lower 5 to 8 cm. long, spreading to ascend-



FIGURE 268.—*Melica montezumae*. Panicle, $\times 1$; spikelet, $\times 5$. (Pringle 430, Mexico.)

ing; spikelets pale; falling entire, 7 to 8 mm. long, more or less pendulous on filiform pedicels; glumes exceeding the florets, hyaline toward the summit, the first 4 mm. broad, expanded at maturity, the second slightly shorter and narrower; fertile floret 1,

the lemma scabrous, strongly nerved and with a few flat twisted golden hairs about the middle; rudiment obconic. 2 —Shaded mountain slopes and canyons, Pecos and Brewster Counties, Tex., and northern Mexico.

15. *Melica torreyana* Scribn. TORREY MELIC. (Fig. 269.) Culms 30 to 100 cm. tall, ascending from a loose decumbent not bulbous base; blades lax, 1 to 3 mm. wide; panicle narrow, rather loose, 8 to 20 cm. long, the branches more or less fascicled, appressed or ascending, the lower fascicles distant; spikelets 4 to 6 mm. long, with 1 or 2 perfect florets and a minute obovoid, long-stiped rudiment; glumes strongly nerved, as long as the spikelet or nearly so; lemmas pubescent, subacute. 2 —Thickets and banks at low altitudes, central California, especially in the bay region.



FIGURE 269.—*Melica torreyana*. Panicle, $\times 1$; floret, $\times 5$. (Chase 5686, Calif.)

16. *Melica imperfecta* Trin. CALIFORNIA MELIC. (Fig. 270.) Resembling *M. torreyana*; culms erect or ascending; the base sometimes decumbent or stoloniferous; panicle 5 to 30 cm. long, the lower branches commonly ascend-



FIGURE 270.—*Melica imperfecta*. Panicle, $\times 1$; spikelet, $\times 5$. (Elmer 4710, Calif.)

ing to spreading; spikelets usually with 1 perfect floret and an oblong, short-stiped rudiment appressed to the palea; glumes indistinctly nerved; lemma a little longer than the glumes, glabrous, indistinctly nerved, obtuse. 2 —Dry open woods and rocky hillsides, at low and medium altitudes, central and southern California, especially in the Coast Ranges; Baja California.

A few forms have been distinguished as varieties.

MELICA IMPERFECTA var. REFRÁCTA Thurb. Lower branches of panicle spreading or reflexed; blades pubescent. 2 —Southern California. **MELICA IMPERFECTA var. FLEXUÓSA** Boland. Like the preceding but blades glabrous. 2 —Central and southern California. **MELICA IMPERFECTA var. MÍNOR** Scribn. Culms less than 30 cm. tall; blades glabrous, 1 to 2 mm. wide. 2 —Southern California.

17. *Melica frutescens* Scribn. (Fig. 271.) Culms 0.75 to 2 m. tall, sparingly branching, rather woody below, not bulbous at base; sheaths retrorsely scabrous; blades rather firm, 2 to 4 mm. wide, those of the innova-



FIGURE 271.—*Melica frutescens*. Plant, $\times 1$; floret, $\times 5$. (Munz, Johnston, and Harwood 4143, Calif.)

FIGURE 272.—*Melica californica*. Plant, $\times 1$; floret, $\times 5$. (Hoffman 37, Calif.)

tions, 1 to 2 mm. wide, subinvolute; panicle silvery-shining, narrow, rather dense, 10 to 30 cm. long, the branches short, appressed; spikelets short-pediceled, 12 to 15 mm. long; glumes nearly as long as the spikelet, prominently 5-nerved; lemmas subacute, faintly 7-nerved. $\text{\textcircled{2}}$ —Hills and canyons, at low and medium altitudes, Arizona and southern California (Inyo County and southward); Baja California.

18. *Melica californica* Scribn. (Fig. 272.) Culms 60 to 120 cm. tall, the base usually decumbent, often more

or less bulbous; sheaths glabrous or pubescent, the lower persistent, brown and shredded; blades 1 to 4 mm. wide; panicle narrow, rather dense, 10 to 20 cm. long, tawny to purplish, not silvery; spikelets short-pediceled, 10 to 12 mm. long (rarely shorter) with 2 to 4 florets besides the rudiment; glumes scaberulous, a little shorter than the spikelets; lemmas rather prominently 7-nerved, scaberulous, subacute to obtuse, often emarginate. $\text{\textcircled{2}}$ (*M. bulbosa* Geyer ex Thurb., not *M. bulbosa* of this work.)—Mountain meadows and rocky woods, at low and medium altitudes, Oregon (Malheur County) and California.

MELICA CALIFORNICA var. **NEVADENSIS** Boyle. Spikelets mostly 2-flowered, 7 to 8 mm. long, the glumes about equaling the upper floret. $\text{\textcircled{2}}$ —In the lower Sierra Nevada, California.

MELICA ALTÍSSIMA L. Tall perennial; blades 15 to 20 cm. long, 5 to 10 mm. wide; panicle narrow, dense, tawny to purple; spikelets about 12 mm. long; glumes and lemmas broad, papery. $\text{\textcircled{2}}$ —Sometimes cultivated for ornament. Eurasia.

MELICA CILIÁTA L. Panicle pale, narrow, condensed, silky. $\text{\textcircled{2}}$ —Occasionally cultivated for ornament. Europe.

31. SCHIZÁCHNE Hack.

Spikelets several-flowered, disarticulating above the glumes and between the florets, the rachilla glabrous; glumes unequal, 3- and 5-nerved; lemmas lanceolate, strongly 7-nerved, long-pilose on the callus, awned from just below the teeth of the prominently bifid apex; palea with softly pubescent, thickened submarginal keels, the hairs longer toward the summit. Rather tall perennial with simple culms and open rather few-flowered panicle. Type species, *Schizachne fauriei* Hack. (*S. purpurascens*). Name from Greek *schizein*, to split, and *achne*, chaff, alluding to the bifid lemma.

1. *Schizachne purpurascens* (Torr). Swallen. FALSE MELIC. (Fig. 273.) Culms erect from a loosely tufted



FIGURE 273.—*Schizachne purpurascens*. Plant, $\times \frac{1}{2}$; lemma, palea, and caryopsis, $\times 5$. (Chase 7444, N. Y.)



FIGURE 274.—*Vaseyochloa multinervosa*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Swallen 1854, Tex.)

decumbent base, 50 to 100 cm. tall; sheaths closed; blades flat, narrowed at the base, 1 to 5 mm. wide; panicle about 10 cm. long, the branches single or in pairs, more or less drooping, bearing 1 or 2 spikelets; spikelets 2 to 2.5 cm. long; glumes purplish, less than half as long as the spikelet; lemmas about 1 cm. long, the awn as long as the lemma or longer. 2 (*Melica striata* Hitchc.; *M. purpurascens* Hitchc.; *Avena torreyi* Nash.)—Rocky woods, Newfoundland to southern Alaska, south to Maryland, Kentucky, South Dakota, and Montana, and in the mountains from British Columbia to New Mexico; Siberia and Japan.

32. VASEYÓCHLOA Hitchc.

Spikelets subterete or slightly compressed, several-flowered, the rachilla disarticulating above the glumes and between the florets, the joints very short; glumes rather firm, unequal, much shorter than the lemmas, the first 3- to 5-nerved, the second 7- to 9-nerved; lemmas rounded on the back, firm, closely imbricate, 7- to 9-nerved, broad, narrowed to an obtuse entire apex and with a stipelike hairy callus, pubescent on the lower part of the back and margins; palea shorter than the lemma, splitting at maturity, the arcuate keels strongly wing-margined; caryopsis concavo-convex, oval, black, the base of the

styles persistent as a 2-toothed crown. Slender perennial with elongate blades and somewhat open panicles. Type species, *Vaseyochloa multinervosa*. Named from Vasey and Greek, *chloa*, grass.

1. *Vaseyochloa multinervosa* (Vasey) Hitchc. (Fig. 274.) Culms erect, loosely tufted, 40 to 100 cm. tall, with slender rhizomes; sheaths scarberulous, pilose at the throat; blades flat to loosely involute, 1 to 4 mm. wide; panicle narrow, loose, 5 to 20 cm. long, the branches few, at first appressed, later spreading, the lower as much as 8 cm. long, bearing a few spikelets from about the middle; spikelets 12 to 18 mm. long, 6- to 12-flowered, purple-tinged; glumes acute, the first narrow, 4 mm. long, the second broad, 5 mm. long; lemmas narrowed to an obtuse point, about 6 mm. long, the nerves becoming rather obscure toward maturity; grain 2.5 to 3 mm. long, 1.5 to 2 mm. wide, deeply concave on the ventral side. 2 (*Melica multinervosa* Vasey; *Distichlis multinervosa* Piper.)—Sandy open woods or open ground, southeastern Texas; rare. The rhizomes appear to break off readily, most herbarium specimens being without them.

32A. ECTOSPERMA Swallen

(See pp. 860, 995)

33. TRÍDENS Roem. and Schult.

(Included in *Triodia* R. Br. in Manual, ed. 1.)

Spikelets several-flowered, the rachilla disarticulating above the glumes and between the florets; glumes membranaceous, often thin, nearly equal in length, the first sometimes narrower, 1-nerved, the second rarely 3- to 5-nerved, acute to acuminate; lemmas broad, rounded on the back, the apex from minutely emarginate or toothed to deeply and obtusely 2-lobed, 3-nerved, the lateral nerves near the margin, the midnerve usually excurrent between the lobes as a minute point or as a short awn, the lateral nerves often excurrent as minute points, all the nerves pubescent below (subglabrous in 1 species), the lateral nerves sometimes conspicuously so throughout; palea broad, the 2 nerves near the margin, sometimes villous; grain concavo-convex. Erect, tufted perennials, rarely rhizomatous or stoloniferous, the blades usually flat, the inflorescence an open to contracted or capitate panicle. Type species,

T. quinquifidus Roem. and Schult. (*T. flavus*). Name from Latin, *tria*, thrice, and *dens*, tooth, referring to the 3-toothed lemma.

In general the species of *Tridens* are of little importance economically, *T. grandiflorus*, *T. elongatus*, and *T. pilosus* being the most useful on the range. *Tridens pulchellus* is often abundant, but is not relished by stock, the little dry plants seldom being eaten.

1a, Panicle capitate, exceeded by fascicles of leaves; low creeping plants.

1. *T. PULCHELLUS*.

1b. Panicle exserted, open or spikelike; plants not creeping.

2a. Panicle open, or loose, not dense or spikelike.

Pedicels of the lateral spikelets less than 1 mm. long..... 8. *T. AMBIGUUS*.

Pedicels all slender, more than 1 mm. long (some short in *T. buckleyanus*).

Lateral nerves not excurrent.

Spikelets not more than 5 mm. long; lemmas 2 mm. long.

9. *T. ERAGROSTOIDES*.

Spikelets 6 to 8 mm. long; lemmas 4 to 5 mm. long.....

6. *T. BUCKLEYANUS*.

Lateral nerves excurrent as short points.

Rhizomes developed, scaly and creeping.....

7. *T. CAROLINIANUS*.

Rhizomes wanting.

Panicle 5 to 15 cm. long; blades 1 to 3 mm. wide.....

13. *T. TEXANUS*.

Panicle 15 to 30 cm. long, the branches viscid; blades 3 to 10 mm. wide.

Panicle rather dense, the branches narrowly ascending, floriferous nearly to the base.....

11. *T. OKLAHOMENSIS*.

Panicle open, the branches widely spreading, loosely flowered, naked at the base.

Panicle erect, the branches stiffly spreading; pulvini hairy, extending entirely around the base of the branches.....

12. *T. CHAPMANI*.

Panicle drooping; pulvini confined to the upper surface at the base of the branches.....

10. *T. FLAVUS*.

2b. Panicle narrow, contracted or spikelike, the branches appressed. (See also *T. carolinianus*.)

Panicle dense, oval or oblong, mostly less than 10 cm. long.

Lemmas deeply 2-lobed.

Lobes of lemma 1.5 to 2.5 mm. long, firm, scarcely shining; awn longer than the lobes; panicles mostly oval, not more than 6 cm. long, usually less, often purple tinged.....

2. *T. GRANDIFLORUS*.

Lobes of lemma 1 to 1.5 mm. long, obtuse, thin, shining; awn scarcely longer than the lobes; panicles oblong, 5 to 8 cm. long, very dense, tawny.

3. *T. NEALLEYI*.

Lemmas minutely notched, not lobed.

Panicle 1 to 2 cm. long; lemma margins densely long-ciliate; palea half as long as the lemma.....

4. *T. PILOSUS*.

Panicle 4 to 10 cm. long; lemma margins short-pilose near base; palea about as long as the lemma.....

5. *T. CONGESTUS*.

Panicle slender, spikelike (long and dense in *T. strictus*).

Lemmas glabrous. Panicle whitish.....

15. *T. ALBESCENS*.

Lemmas pilose on the margins.

Lemmas mucronate; panicle dense.....

14. *T. STRICTUS*.

Lemmas not mucronate (rarely lowest lemma obscurely so); panicle not dense.

Glumes acuminate, longer than the lowest floret, the second 3-nerved; blades mostly flat, some of them 2 to 4 mm. wide.....

17. *T. ELONGATUS*.

Glumes obtuse, short, the second 1-nerved; blades mostly folded or involute, mostly about 1 mm. wide.....

16. *T. MUTICUS*.

1. *Tridens pulchellus* (H. B. K.)

Hitchc. FLUFFGRASS. (Fig. 275.) Low, tufted, usually not more than 15 cm. high; culms slender, scabrous or puberulent, consisting of 1 long internode, bearing at the top a fascicle of narrow leaves, the fascicle finally bending over to the ground, taking root and producing other culms, the

fascicles also producing the inflorescence; sheaths striate, papery-margined, pilose at base; blades involute, short, scabrous, sharp-pointed; panicle capitate, usually not exceeding the blades of the fascicle, consisting of 1 to 5 nearly sessile relatively large white woolly spikelets; glumes

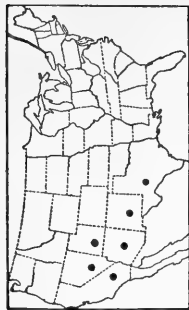


FIGURE 275.—*Tridens pulchellus*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Chase 5511, Ariz.)



FIGURE 276.—*Tridens grandiflorus*. Plant, $\times \frac{1}{2}$; floret, $\times 5$. (Eggleston 10973, Ariz.)

glabrous, subequal, broad, acuminate, awn-pointed, 6 to 8 mm. long, nearly as long as the spikelet; lemmas 4 mm. long, conspicuously long-pilose below, cleft about halfway, the awn scarcely exceeding the obtuse lobes, divergent at maturity. $\text{\textcircled{2}}$ (*Dasyochloa pulchella* Willd.)—Mesas and rocky hills, especially in arid or semi-arid regions, Texas to Nevada and southern California to southern Mexico.

2. *Tridens grandiflorus* (Vasey) Woot. and Standl. LARGE-FLOWERED TRIDENS. (Fig. 276.) Culms tufted, erect or geniculate below, 10 to 50 cm. tall, often pubescent at the nodes; blades flat or folded, rather firm, white-margined, appressed-pubescent, 1 to 2 mm. wide, those of the culm less than 10 cm. long; panicle dense, oblong, purplish, 2 to 6 cm. long, cleistogamous spikelets borne in the lower sheaths; spikelets 4- to 8-flowered, 5 to 12 mm. long; glumes acuminate, about as long as the first floret; lemmas 4 to 6 mm. long, conspicuously long-pilose on the margins,

densely pilose on the back below, deeply lobed, the awn as long as the lobes, or exceeding them. $\text{\textcircled{2}}$ —Rocky slopes, western Texas to southern Arizona and northern Mexico. This has been referred to *Triodia avenacea* H. B. K., a Mexican species with stolons and smaller purple panicles.

3. *Tridens néalleyi* (Vasey) Woot. and Standl. (Fig. 277.) Culms erect, 20 to 40 cm., or sometimes as much as 60 cm., tall, glabrous or the lower internodes pilose, at least some of the nodes, especially the lower ones, conspicuously bearded; leaves mostly crowded at the base in a dense cluster, the culm leaves rather distant; blades firm, flat or conduplicate, with thick white midnerve and margins, pilose on both surfaces, 5 to 10 cm. long, about 2 mm. wide, the uppermost usually reduced; panicles 4 to 6 cm. long, pale, very densely flowered, the individual spikelets obscured; spikelets 6 to 8 mm. long; glumes equal, acuminate, as long as or somewhat shorter than the spikelet; lemmas 4 to 6 mm. long, the lobes broad, hyaline, obtuse, more or less erose, spreading at maturity; awn as long as or only slightly exceeding the lobes of the lemma. $\text{\textcircled{2}}$ —Rocky slopes, southwestern Texas and New Mexico (Las Cruces); northern Mexico.



FIGURE 277.—*Tridens nealleyi*. Floret, $\times 5$. (Nealley 153, Tex.)

4. *Tridens pilosus* (Buckl.) Hitchc. HAIRY TRIDENS. (Fig. 278.) Culms erect, densely tufted, 10 to 30 cm. tall, usually only 1 node showing, the tufts easily pulled up; sheaths pilose at the throat; blades 1 to 1.5

mm. wide, flat or folded, mostly in a short basal cluster, somewhat pilose, the margins thick, white, the culm blades 1 to 2 cm. long; panicle long-exserted, ovoid, 1 to 2 cm. long, pale or purplish, of 3 to 10 large short-pediceled spikelets; spikelets 6- to 12-flowered, 1 to 1.5 cm. long, compressed, glumes about two-thirds as long as the lower florets; lemmas about 6 mm. long, densely pilose toward the base, pilose on the margin toward the tip, acute, minutely 2-toothed, the awn 1 to 2 mm. long; palea half as long as the lemma, pilose on the back and margins below.

4 (*Triodia acuminata* Vasey; *Tricuspis pilosa* Nash; *Erioneuron pilosum* Nash.)—Plains and rocky hills, western Kansas to Nevada, south to Texas, Arizona, and central Mexico.

5. ***Tridens congestus*** (L. H. Dewey) Nash. (Fig. 279.) Culms erect, tufted, 30 to 60 cm. tall; blades flat, 2 to 3



FIGURE 279.—*Tridens congestus*. Panicle, $\times 1$; floret, $\times 5$. (Tracy 8879, Tex.)



FIGURE 278.—*Tridens pilosus*. Plant, $\times \frac{1}{2}$; floret, $\times 5$. (Griffiths 6427, Tex.)

mm. wide, tapering to a fine point; panicle mostly dense, pale or pinkish, 4 to 10 cm. long, sometimes interrupted below; spikelets rather turgid, 6- to 12-flowered, 5 to 10 mm. long; lemmas 3 to 4 mm. long, broad, obtuse, short-pilose on the midnerve and margin below, the apex slightly notched, the awn less than 1 mm. long; palea about as long as the lemma, broad, abruptly bowed out below. 4 —Sandy or dry plains, southern Texas.

6. ***Tridens buckleyanus*** (L. H. Dewey) Nash. (Fig. 280.) Culms erect, tufted, 30 to 60 cm. tall; sheaths scaberulous, sometimes sparsely pilose; blades flat, 1 to 3 mm. wide, tapering to a fine point; panicle 10 to 20 cm. long, the few branches distant, ascending to spreading, as much as 7 cm. long; spikelets pale to dark purple, short-pediceled, appressed, rather few and somewhat distant along the simple branches, 3- to



FIGURE 280.—*Tridens buckleyanus*. Panicle, $\times 1$; floret, $\times 5$. (Tharp 2996, Tex.)

5-flowered, 6 to 8 mm. long; glumes slightly shorter than the lower florets; lemmas 4 to 5 mm. long, pubescent on the callus and on the lower two-thirds of the midnerve and margin, the apex obtuse, entire, the midnerve not or

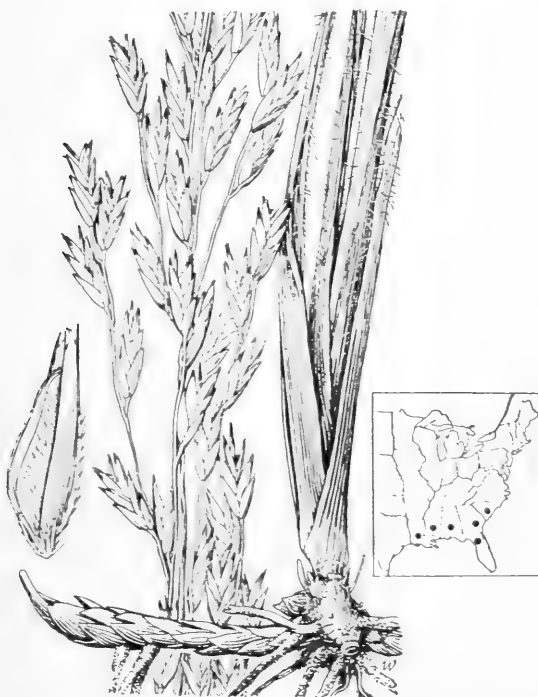


FIGURE 281.—*Tridens carolinianus*. Plant, $\times 1$; floret, $\times 5$. (Bartlett 3224, Ala.)

scarcely excurrent; palea a little shorter than the lemma, pubescent along the margins; grain elliptic, 3 mm. long. 2 —Rocky wooded slopes, southern Texas.

7. *Tridens carolinianus* (Steud.) Henr. (Fig. 281.) Culms slender, erect, 1 to 1.5 m. tall, with creeping scaly rhizomes; lower sheaths pubescent; blades flat, elongate, 2 to 7 mm. wide; panicle purplish, narrow, rather loose, nodding, 10 to 20 cm. long, the branches appressed or narrowly ascending; spikelets short-pedicelled, 3- to 5-flowered, 7 to 10 mm. long; glumes broad, mucronate from a notched apex; lemmas about 5 mm. long, pilose on the callus and on the lower half of the midnerve and margins, the summit lobed, the 3 nerves excurrent less than 1 mm.; palea glabrous, a little shorter than the lemma, bowed out below. 2 (*Triodia drummondii* Scribn. and Kearns., *Tridens drummondii* Nash.)—Sandy woods, Coastal Plain, South Carolina to Florida and Louisiana.

8. *Tridens ambiguus* (Ell.) Schult. (Fig. 282.) Culms slender, erect, 60 to 100 cm. tall; lower sheaths glabrous; blades flat or loosely involute, 1 to 5 mm. wide; panicle open, ovoid, pale or purplish, 8 to 20 cm. long, the branches ascending, 3 to 8 cm. long; spikelets on pedicels less than 1 mm. long along the simple branches, 4- to 7-flowered, 4 to 6 mm. long, nearly as broad, the florets crowded; glumes broad, subacute; lemmas 3 to 4 mm. long, mucronate from a minutely lobed apex, the lateral nerves scarcely or barely exerted, pilose on the midnerve and margins on the lower half; palea nearly as long as the lemma, the keels bowed out below. 2 (*Triodia langloisii* (Nash) Bush.)—Wet pine barrens, on the coast, South Carolina to Florida and Texas.

9. *Tridens eragrostoides* (Vasey and Scribn.) Nash. (Fig. 283.) Culms slender, erect, densely tufted, 50 to 100 cm. tall; blades flat, 1 to 4 mm. wide, setaceous-tipped; panicle open, 10 to 30 cm. long, the branches rather

distant, slender, flexuous, spreading or drooping, 5 to 15 cm. long, nearly simple, rather few-flowered; spikelets on slender pedicels 1 to 10 mm. long, oblong, mostly 6- to 10-flowered, scarcely 5 mm. long; glumes acuminate; lemmas about 2 mm. long, obtuse, obscurely pubescent along the midnerve on the lower half, the margins pubescent, the midnerve minutely excurrent. 2 — Dry ground among shrubs, Florida Keys, Texas, Arizona, and northern Mexico; Cuba.

10. *Tridens flavus* (L.) Hitchc. PURPLETOP. (Fig. 284.) Culms erect, tufted, 1 to 1.5 m. tall; basal sheaths compressed-keeled; blades elongate, 3 to 10 mm. wide, very smooth; panicle open, 15 to 35 cm. long, usually purple or finally nearly black, rarely yellowish, the branches distant, spreading to drooping, naked below, as much as 15 cm. long, with slender divergent branchlets, the axils pubescent, the axis, branches, branchlets, and pedicels viscid; spikelets oblong, mostly 6- to 8-flowered, 5 to 8 mm. long; glumes subacute, mucronate; lemmas 4 mm. long, obtuse, pubescent on the callus and lower half of keel and margins, the 3 nerves excurrent; palea a little shorter than the lemma, somewhat bowed out below. 2 (*Tricuspis seslerioides* Torr.)— Old fields and open woods, New Hampshire to Nebraska, south to Florida and Texas. The type specimen is the rare form with yellowish panicle. In some Florida specimens the excurrent nerves of the lemma are as much as 1 mm. long.

11. *Tridens oklahomensis* (Feath.) Feath. (Fig. 285.) Culms 120 to 150 cm. tall, densely tufted, stout, erect, more or less viscid, especially at and below the nodes; blades to 60 cm. long and 12 mm. wide, flat, glabrous or sparsely pilose on the upper surface at the base; panicles terminal and axillary, purple, the terminal ones 20 to 25 cm. long, the long branches narrowly ascending, floriferous nearly to the base; spikelets 6 to 8 mm. long,



FIGURE 282.—*Tridens ambiguus*. Panicle, $\times 1$; floret, $\times 5$. (Curtiss 5020, Fla.)

7- to 9-flowered, short-pedicelled; glumes equal, acute, about 4 mm. long; lowest lemma 4 mm. long. 2 — Wet meadows, near Stillwater, Okla.

12. *Tridens chapmani* (Small) Chase. (Fig. 286.) Culms 60 to 160 cm. tall, slender or occasionally rather



FIGURE 283.—*Tridens eragrostoides*. Panicle, $\times 1$; two views of floret, $\times 5$. (Swallen 1471, Tex.)

coarse; lower leaves crowded toward the base, the sheaths narrow, spreading from the culm, keeled, glabrous, densely villous on the collar; blades flat or loosely rolled, elongate, attenuate, 3 to 7 mm. wide, narrowed toward the base; panicles 15 to 25 cm. long, usually erect, the branches



FIGURE 284.—*Tridens flavus*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Dewey 350, Va.)

and branchlets stiffly spreading, the bases of the principal ones surrounded by glandular hairy pulvini; spikelets long-pedicceled, divergent, 7 to 10 mm. long, pale or purple-tinged. ♀ — Dry pine and oakwoods, New Jersey, Virginia, Missouri, and Oklahoma, south to Florida and Texas.

13. *Tridens texanus* (S. Wats.) Nash. (Fig. 287.) Culms erect, densely tufted, 20 to 40 cm. tall; sheaths pubescent at throat and on the collar; blades flat or subinvolute, 1 to 4 mm. wide, tapering to a slender point; panicle open, 5 to 15 cm. long, nodding, the branches rather distant, flexuous, drooping, few-flowered; spikelets oblong, 6- to 10-flowered, 6 to 10 mm. long, rather turgid, pink or purplish, more or less nodding on short pedicels; glumes broad, acute to obtuse; lemmas 4 to 5 mm. long, obtuse, minutely lobed, the margins densely pilose near the base, the keel glabrous or sparsely pilose below, the 3 nerves short-



FIGURE 285.—*Tridens oklahomensis*. Panicle, $\times 1$; floret, $\times 5$. (Wade 77, Okla.)

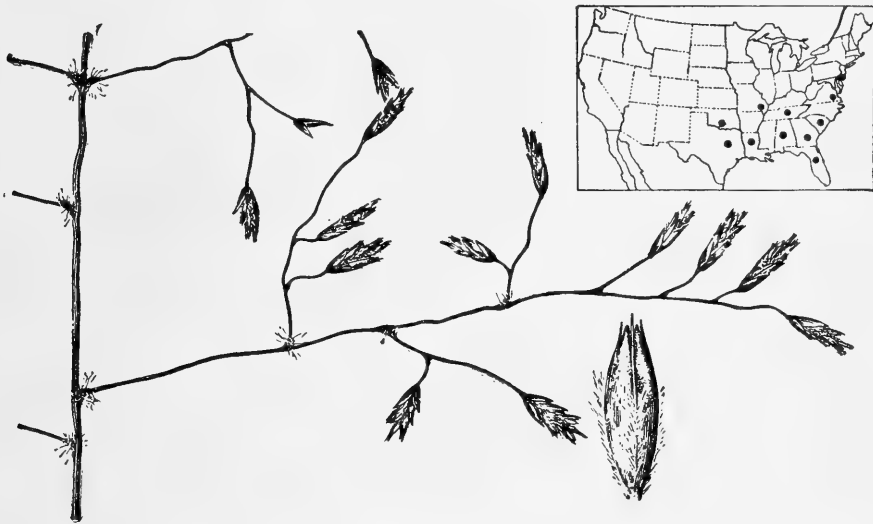


FIGURE 286.—*Tridens chapmani*. Panicle, $\times 1$; floret, $\times 10$. (Harper 1714, Ga.)

excurrent; palea about as long as the lemma, strongly bowed out at base. ♀ — Plains and dry slopes, central and southern Texas, and northern Mexico.

14. *Tridens strictus* (Nutt.) Nash. (Fig. 288.) Culms rather stout, erect, 1 to 1.5 m. tall; blades elongate, flat or loosely involute, 3 to 8 mm. wide; panicle dense, spikelike, more or less

interrupted below, narrowed above, 10 to 30 cm. long; spikelets short-pedicceled, 4- to 6-flowered, about 5 mm. long, the florets closely imbricate; glumes as long as the spikelet, or nearly so, the apex spreading, the keel glandular viscid toward maturity; lemmas about 3 mm. long, obtuse, the keel and margins pilose on the lower half to two-thirds, the midnerve ex-



FIGURE 287.—*Tridens texanus*. Panicle, $\times 1$; floret, $\times 5$. (Wooton, Tex.)

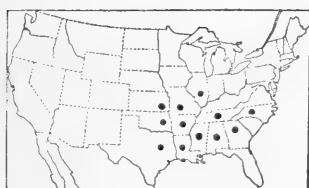
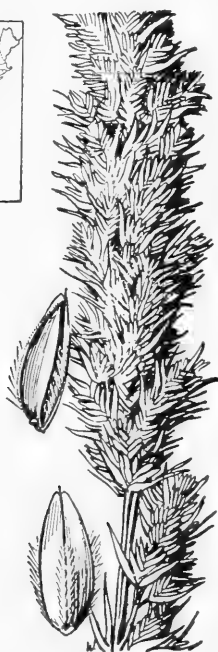


FIGURE 288.—*Tridens strictus*. Panicle, $\times 1$; two views of floret, $\times 5$. (Newton, Kans.)



current as a minute awn; palea about as long as the lemma, short-ciliate on the sharp keels, not strongly bowed out. $\text{\textcircled{2}}$ (*Tricuspis stricta* A. Gray.)—Low moist ground and low woods,

Illinois and Kansas to North Carolina, Alabama, and Texas.

15. *Tridens albescens* (Vasey) Woot. and Standl. WHITE TRIDENS. (Fig. 289.) Culms erect, tufted, 30 to 80 cm. tall; blades flat to loosely involute, elongate, 2 to 4 mm. wide, tapering to a fine point; panicle narrow, rather dense, greenish to nearly white, 10 to 20 cm. long; spikelets short-pediceled, 8- to 12-flowered, 5 to 7 mm. long, the florets closely imbricate; glumes a little longer than the first lemma, subacute; lemmas 3 mm. long, obscurely pubescent on the callus, otherwise glabrous, obtuse, the midnerve minutely or not at all excurrent; palea a little shorter than the lemma, bowed out below. $\text{\textcircled{2}}$ (*Rhombolytrum albescens* Nash.)—Plains and open woods, Kansas and Colorado to Texas and New Mexico; northern Mexico.



FIGURE 289.—*Tridens albescens*. Panicle, $\times 1$; two views of floret, $\times 5$. (Ball 1652, Tex.)

16. *Tridens müticus* (Torr.) Nash. SLIM TRIDENS. (Fig. 290.) Culms slender, densely tufted, 30 to 50 cm. tall; sheaths and blades scaberulous, the sheaths usually loosely pilose, more densely so at the summit; blades flat or subinvolute, 1 to 3 mm. wide, sometimes sparsely pilose; panicle narrow, rather dense, interrupted, the branches short, appressed; spikelets

6- to 8-flowered, about 1 cm. long, pale to purplish, nearly terete; glumes scaberulous, about as long as the lower florets; lemmas about 5 mm. long, densely pilose on the lower half of the nerves and on the callus, obtuse, entire or minutely notched, the midnerve not exerted; palea half or two-thirds as long as the lemma, densely pilose on the keels and puberulent on the back. 2 —Plains and rocky slopes, Texas to southeastern California, north to Nevada and Utah; Mexico.



FIGURE 291.—*Tridens elongatus*. Panicle, $\times 1$; two views of floret, $\times 5$. (Ball 1535, Tex.)



FIGURE 290.—*Tridens muticus*. Panicle, $\times 1$; two views of floret, $\times 5$. (Chase 5902, Tex.)

sheaths and blades scaberulous, sometimes sparsely pilose, the blades mostly flat, 2 to 4 mm. wide, tapering to a fine point; panicle elongate; erect, pale or purple-tinged, loosely flowered, 10 to 25 cm. long, the branches rather distant, appressed, scarcely or not at all overlapping; spikelets similar to those of *T. muticus*, the glumes longer, the hairs on the florets not so long. 2 (*Tricuspis elongata* Nash.)

17. *Tridens elongatus* (Buckl.) Nash. ROUGH TRIDENS. (Fig. 291.) Culms erect, tufted, 40 to 80 cm. tall;

—Plains, sandy prairies, and rocky slopes, Missouri to Colorado, Texas, and Arizona.

34. TRÍPLASIS Beauv.

Spikelets few-flowered, V-shaped, the florets remote, the rachilla slender, disarticulating above the glumes and between the florets; glumes nearly equal, smooth, 1-nerved, acute; lemmas narrow, 3-nerved, 2-lobed, the nerves parallel, silky-villous, the lateral pair near the margin, the midnerve excurrent as an awn, as long as the lobes or longer; palea shorter than the lemma, the keels densely long-villous on the upper half. Slender tufted annuals or perennials, with short blades, short, open, few-flowered, purple, terminal panicles and cleistogamous narrow panicles in the axils of the leaves. Both species have, in addition to the small panicles of cleistogamous spikelets in the upper sheaths, additional cleistogamous spikelets, usually reduced to a single large floret, at the bases of the lower sheaths. The culms break at the nodes, the mature

cleistogenes remaining within the sheaths. Type species, *Triplasis americana*. Name from Greek *triplosios*, triple, alluding to the awn and the two subulate lobes of the lemma. The species are of no importance except as they tend to hold sandy soil.

Lobes of lemma not subulate-pointed; awn shorter than the lemma; annual.

1. *T. PURPUREA*.

Lobes of lemma subulate-pointed; awn longer than the lemma; perennial.

2. *T. AMERICANA*.

1. *Triplasis purpurea* (Walt.) Chapm. PURPLE SANDGRASS. (Fig. 292.) Annual, often purple; culms ascending to widely spreading, pubescent at the several to many nodes, 30 to 100 cm. tall, rarely taller; blades flat or loosely involute, 1 to 3 mm. wide, mostly 4 to 8 cm. long; panicle 3 to 5 cm. long, with few spreading few-flowered branches, the axillary more or less enclosed in the sheaths; spikelets short-pedicel, 2- to 4-flowered, 6 to 8 mm. long; lemmas 3 to 4 mm. long, the lobes broad, rounded or truncate, the nerves and callus densely short-villous, the awn about as long as the lobes or somewhat exceeding them; palea conspicuously silky-villous on the upper half of the keels; grain about 2 mm. long. ☉ —Dry sand, Ontario, Maine, and New Hampshire to Minnesota and Nebraska, south to Florida and Texas; Colorado (introduced?); Honduras. In autumnal culms the numerous short joints with sheaths swollen at the base, containing cleistogenes, are conspicuous. Plants with awns exceeding the lobes of the lemma have been differentiated as *T. intermedia* Nash.

2. *Triplasis americana* Beauv. (Fig. 293.) Perennial; culms slender, tufted, mostly erect, 30 to 60 cm. tall; blades flat or subinvolute, mostly 15 to 18 cm. long; panicle 2 to 5 cm. long, the few slender ascending branches with 1 or 2 spikelets; spikelets mostly 2- or 3-flowered, about 1 cm. long; lemmas 5 to 6 mm. long, the lobes about half as long as the entire lemma, subulate-pointed, the nerves with a narrow stripe of silky hairs, the awn 5 to 8 mm. long, pubescent below; keels of the palea long-villous, the hairs erect. ☉ —Dry sand, Coast-

al Plain, North Carolina to Florida and Mississippi.

35. *NEOSTÄPFIA* Davy

(Included in *Anthochloa* Nees in Manual, ed. 1)

Spikelets few-flowered, subsessile, closely imbricate around a simple axis, the rachilla disarticulating between the florets; glumes wanting; lemmas flabellate, prominently many-nerved; palea much narrower and a little shorter than the lemma, obtuse, hyaline. Low annual with loose sheaths merging into rather broad flat blades without definite junction and dense cylindric panicles, the axis prolonged beyond the spikelets, this portion naked or bearing small bracts. Type species, *Neostapfia colusana*. Named for Otto Stapf. (Distinguished from *Anthochloa* Nees, of the Andes, in which the axis is not prolonged, the short-pedicel spikelets have well-developed persistent glumes, the lemmas are not strongly nerved, and the sheaths and blades are distinctly differentiated.)

1. *Neostapfia colusana* (Davy) Davy. (Fig. 294.) Culms 7 to 30 cm. long, ascending from a decumbent base; leaves overlapping, loosely folded around the culm, 5 to 10 cm. long, 6 to 12 mm. wide at the middle, tapering toward both ends, minutely ciliate, with raised viscid glands on the nerves and margins; panicles pale green, at first partly included, later short-exserted, 3 to 7 cm. long, 8 to 12 mm. thick; spikelets usually 5-flowered, 6 to 7 mm. long; lemmas flabellate, very broad, 5 mm. long, ciliate-fringed, the many nerves viscid-glandular at maturity. ☉ (*Anthochloa colusana* (Davy) Scribn.) —Bordering rain pools on hard alkali

FIGURE 292.—*Triplasis purpurea*. Plant, $\times \frac{1}{2}$; spikelet, floret, and cleistogamous spikelet, $\times 5$. (Commons 255, Del.)



soil, Colusa, Stanislaus, and Merced Counties, Calif. At maturity the en-

tire plant is thickly beset with minute raised viscid glands.

36. ORCÚTTIA Vasey

Spikelets several-flowered, the upper florets reduced, the rachilla continuous, the spikelets persistent even after maturity; glumes nearly equal, shorter than the lemmas, broad, irregularly 2- to 5-toothed, many-nerved, the nerves extending into the teeth; lemmas firm, prominently 13- to 15-nerved, the broad summit toothed; palea broad, as long as the lemma. Low annuals with short culm blades, solitary spikes or spikelike racemes, the sessile spikelets relatively large, the upper aggregate, the lower more or less remote. With the exception of *O. greenei*, the young plants produce elongate juvenile leaves before the development of the culms. Type species, *Orcuttia californica*. Named for C. R. Orcutt.

- Lemmas with 7 to 11 very short teeth..... 1. *O. GREENEI*.
Lemmas with 5 relatively long acuminate or awn-tipped teeth.
Racemes 2 to 5 cm. long, often capitate, the spikelets usually crowded toward the summit, remote toward the base; teeth of lemma unequal, the middle longer than the lateral ones; nerves of lemma relatively faint..... 2. *O. CALIFORNICA*.
Racemes 5 to 10 cm. long, narrow, not capitate, the spikelets rather evenly distributed (the lower distant in *O. tenuis*); teeth of lemma equal; nerves of lemma prominent.
Blades 1 to 2 mm. wide; spikelets mostly 2- to 10-flowered, glabrous.... 3. *O. TENUIS*.
Blades 2 to 6 mm. wide; spikelets mostly 10- to 40-flowered, pilose..... 4. *O. PILOSA*.

1. *Orcuttia greénei* Vasey. (Fig. 295.) Culms 15 to 20 cm. tall, suberect; blades 2 to 3 cm. long, subinvolute; raceme 3 to 7 cm. long, pale; spikelets 10 to 15 mm. long, loosely papillose-pilose; glumes 4 to 5 mm. long; lemmas 6 mm. long, the obtuse or truncate tip spreading, 7- to 11-toothed, the teeth mucronate but not awned. ☉ —Moist open ground, Sacramento and San Joaquin Valleys, Butte and San Joaquin Counties, southeast to Tulare County, Calif. At maturity foliage and spikelets minutely viscid-glandular.

2. *Orcuttia califórnica* Vasey. (Fig. 296.) Culms 5 to 15 cm. long, spreading with ascending ends, forming little mats; foliage thin, pilose, the sheaths loose, the blades 2 to 4 cm. long; raceme loose below, dense or subcapitate at the summit; spikelets 8 to 12 mm. long, densely to sparsely pilose; glumes sharply toothed; lemmas about 6 mm. long, deeply cleft into 5 awn-tipped teeth. The whole plant at maturity more or less viscid-glandular. ☉ —Drying mud flats, near Murrietta, Riverside County, Calif.; Baja California.

ORCUTTIA CALIFORNICA var. *INAEQUÁLIS* (Hoover) Hoover. Resembling the species, but differing in having usually shorter capitate inflorescences



FIGURE 293.—*Triplasis americana*. Panicle, × 1; floret, × 5. (Curtiss 5570, Fla.)

and unequally toothed lemmas; culms ascending or prostrate. Sacramento and San Joaquin Valleys, Sacramento to Tulare County, Calif.

ORCUTTIA CALIFORNICA var. *VÍSCIDA* Hoover. Plants very viscid; teeth of lemma awned, giving the capitate inflorescence a distinctly bristly appearance. Near the Sierra Nevada foothills, Sacramento County, Calif.

3. *Orcuttia ténuis* Hitchc. (Fig. 297.) Culms in small tufts, slender,

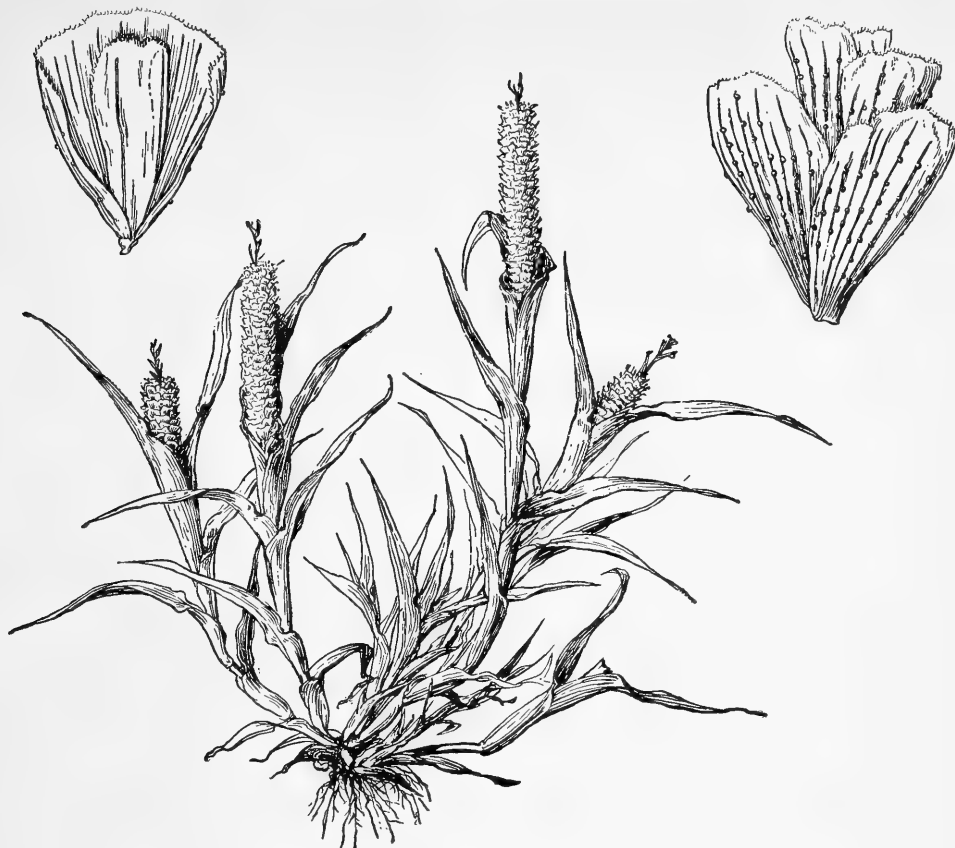


FIGURE 294.—*Neostapfia colusana*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Type.)



FIGURE 295.—*Orcuttia greenei*. Spikelet, $\times 5$. (Type.)



FIGURE 296.—*Orcuttia californica*. Panicle, $\times 1$; floret, $\times 5$. (Munz 10804, Calif.)

erect, 5 to 12 cm. tall; leaves mostly basal, the blades strongly nerved, 1 to 2 cm. long; raceme more than

half the entire height of the plant, the lower spikelets distant, the upper approximate but not crowded; spikelets purple-tinged, 12 to 15 mm. long; glumes and lemmas scabrous, sometimes with a few hairs toward the base of the lemmas; glumes 3 to 4 mm. long, sharply toothed; lemmas 5 mm. long, 5-toothed, the teeth acuminate, awn-tipped, the rigid tips spreading or slightly recurved. ☉ —Beds of vernal pools, Shasta and Tehama Counties, east of the Sacramento River, Calif.

4. *Orcuttia pilósa* Hoover. (Fig. 298.) Culms densely tufted, 5 to 20 cm. tall, erect or geniculate-decumbent at base, viscid at maturity; sheaths and blades pilose or the blades nearly glabrous beneath; racemes 5 to 10 cm. long; spikelets 10- to 40-flowered, appressed or somewhat spreading, the upper crowded, the lower approximate; glumes about 3 mm. long, irregularly 3-toothed;



FIGURE 297.—*Orcuttia tenuis*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Type.)



FIGURE 298.—*Orcuttia pilosa*. Plant, $\times \frac{1}{2}$; floret, $\times 5$. (Hoover 1298, Calif.)

lemmas 4 to 5 mm. long, the teeth equal, acute or awn-tipped, strongly viscid-glandular at maturity; anthers

2.5 to 3 mm. long. ☉ —San Joaquin Valley, Calif., from Stanislaus County to Madera County.

37. BLEPHARIDACHNE Hack.

Spikelets compressed, 4-flowered, the rachilla disarticulating above the glumes, but not between the florets; glumes nearly equal, compressed, 1-nerved, thin, smooth; lemmas 3-nerved, the nerves extending into awns, deeply 3-lobed, conspicuously ciliate, the first and second sterile, containing a palea but no flower, the third fertile, the fourth reduced to a 3-awned rudiment. Low annuals or perennials, with short, dense, few-flowered panicles scarcely exerted from the subtending leaves. Type species, *Blepharidachne kingii*. Name from Greek *blepharis* (blepharid-), eyelash, and *achne*, chaff, alluding to the ciliate lemma.

Glumes a little longer than the florets, acuminate; foliage scaberulous..... 1. B. KINGII.
Glumes a little shorter than the florets, subacute; foliage densely grayish harsh-puberulent.
2. B. BIGELOVII.

1. *Blepharidachne kingii* (S. Wats.) Hack. (Fig. 299.) Low tufted perennial with the aspect of *Tridens pulchellus*, but not rooting at upper nodes; culms mostly less than 10 cm. tall; sheaths with broad hyaline margins; blades less than 1 mm. wide, involute, curved, sharp-pointed, 1 to 3 cm. long; panicles subcapitate, pale or purplish, 1 to 2 cm. long, exceeded

by the upper blades; spikelets flabellate; glumes about 8 mm. long, acuminate, exceeding the florets; sterile lemmas about 6 mm. long, all the lemmas about the same height, long-ciliate on the margins, pilose at the base and on the callus, cleft nearly to the middle, the lateral lobes narrow, obtuse, the nerve at one

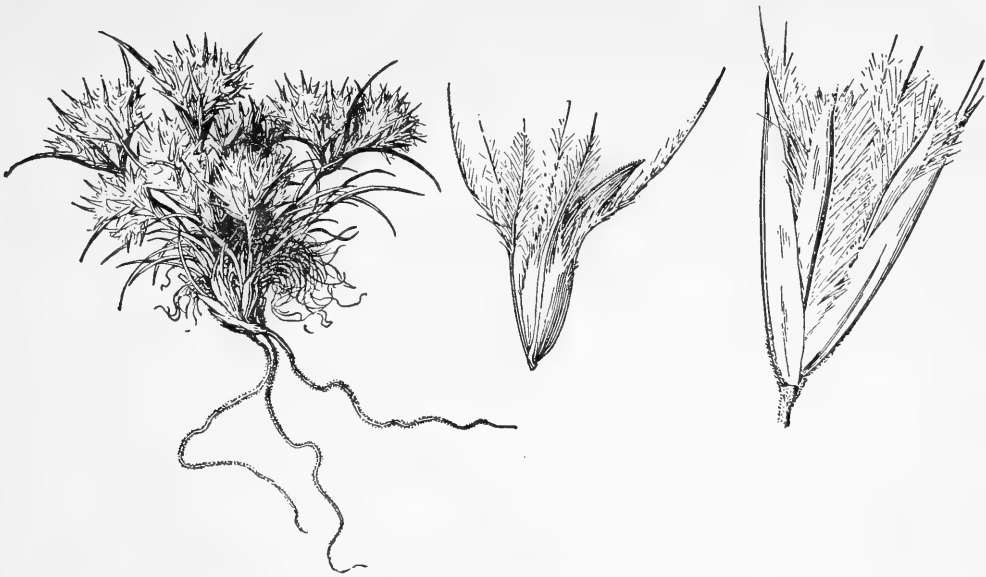


FIGURE 299.—*Blepharidachne kingii*. Plant, $\times 1$; spikelet and perfect floret, $\times 5$. (Jones 4094, Nev.)

margin, awn-tipped, the central lobe consisting of the awn, ciliate below, somewhat exceeding the lateral ones; palea much narrower and somewhat shorter than the lemma; fertile lemma similar to the sterile ones, the palea broad and as long as the lemma; upper sterile lemma on a rachilla segment about 3 mm. long, reduced to 3 plumose awns; grain compressed, 2 mm. long. $\text{\textcircled{2}}$ —Deserts, Utah, Nevada, and California (Death Valley), apparently rather rare, but reported as common and sometimes the dominant grass in desert regions in Elko and White Pine Counties, Nev.

2. *Blepharidachne bigelovii* (S. Wats.) Hack. (Fig. 300.) Perennial, culms stiff, 10 to 20 cm. long, the culms and foliage harsh-puberulent; sheaths broad, firm; blades coarser than in *B. kingii*; panicles dense, oblong, 1 to 3 cm. long, the blades not exceeding the panicle; glumes about 6 mm. long, subacute, shorter than the florets; sterile lemmas ciliate and awned as in *B. kingii*, cleft about 1 mm. $\text{\textcircled{2}}$ —Rocky slopes, Pecos and El Paso Counties, Tex.

38. CÔTTEA Kunth

Spikelets several-flowered, the uppermost reduced, the rachilla dis-



FIGURE 300.—*Blepharidachne bigelovii*. Plant, $\times 1$; fertile floret, $\times 5$. (Type.)



FIGURE 301.—*Cottea pappophoroides*. Plant, $\times \frac{1}{2}$; spikelet, floret, and cleistogene, $\times 5$. (Griffiths 5946, Ariz.)

articulating above the glumes and between the florets; glumes about equal, nearly equaling the lower lemma, with several parallel nerves; lemmas rounded on the back, villous below, prominently 9- to 11-nerved, some of the nerves extending into awns of irregular size and some into awned teeth; palea a little longer than the body of the lemma, the keels near the margin. An erect tufted branching perennial with flat blades and oblong loose panicle. Type species, *Cottea pappophoroides*. Named for Heinrich Cotta.

1. *Cottea pappophoroides* Kunth. (Fig. 301.) Softly pubescent through-

out; culms 30 to 50 cm. tall; blades 3 to 7 mm. wide; panicle 8 to 15 cm. long, the branches loosely ascending; spikelets 4- to 7-flowered, 5 to 7 mm. long, about 5 mm. wide, green or purplish; glumes 4 to 5 mm. long; lemmas 3 to 4 mm. long, the basal hairs conspicuous, at least the middle awn spreading. 2 —Plains and dry hills, western Texas to southern Arizona, south to central Mexico; Ecuador to Argentina. Cleistogamous spikelets, usually reduced to a single floret, are found in the lower sheaths, and often large, very turgid ones at the very base. Not abundant enough to have economic importance.

39. PAPPÓPHORUM Schreb. PAPPUSGRASS

Spikelets 4- to 6-flowered, the lower 1 to 3 fertile, the upper reduced, the rachilla disarticulating above the glumes, but not or only tardily between the florets, the internodes very short; glumes nearly equal, keeled, thin-membranaceous, as long as the body of the florets, 1-nerved, acute; lemmas rounded on the back, firm, obscurely many-nerved, dissected above into numerous spreading, unequal awns, the florets falling together, the awns of all forming a pappuslike crown; palea as long as the body of the lemma, the nerves near the margin. Erect tufted perennials, with narrow or spikelike whitish to tawny or purplish panicles. Type species, *Pappophorum alopecuroideum* Vahl. Name from Greek *pappos*, pappus, and *phoros*, bearing, alluding to the pappuslike crown of the lemma. Our species are of minor economic importance.

Panicle spikelike, tawny or whitish..... 1. *P. mucronulatum*.
Panicle narrow but rather loose, pinkish..... 2. *P. bicolor*.

1. *Pappophorum mucronulatum*

Nees. (Fig. 302.) Culms erect, 60 to 100 cm. tall; blades flat to subinvolute, 2 to 5 mm. wide; panicle spike-like, tawny or whitish, tapering at summit, 10 to 20 cm. long; spikelets short-pedicel with 1 or 2 fertile florets and 2 or 3 sterile reduced ones, the rachilla disarticulating below the fertile floret and tardily above it; glumes 1-nerved; fertile lemma subindurate, the nerves obscure, villous toward base, dissected into numerous unequal awns 2 to 5 mm. long, the body about 3 mm. long. 2 (*P. apertum* Munro.)—Low places on plains and in valleys, Texas, Arizona, and northern Mexico; South America; wool waste, Maine.

2. *Pappophorum bicolor* Fourn. (Fig. 303.) Culms erect, 30 to 80 cm.

tall; blades flat to subinvolute, 1 to 5 mm. wide; panicle mostly 10 to 15 cm. long, usually pink-tinged, rather loose, the branches 1 to 4 cm. long; spikelets on pedicels 1 to 5 mm. long, with 2 or 3 fertile florets and 1 or 2 sterile reduced ones, all about the same height in the spikelet, the rachilla not separating between the florets; glumes 1-nerved; lemmas somewhat indurate, obscurely nerved, pilose on the callus and on the lower half to two-thirds of the midnerve and margins, dissected into about 12 somewhat unequal scabrous awns 2 to 4 mm. long, the body about 3 mm. long, the awns about as long. 2 —Open valley land, Texas, Arizona (La Noria, near Monument 111), and Mexico.



FIGURE 302.—*Pappophorum mucronulatum*. Plant, $\times \frac{1}{2}$; spikelet and perfect floret, $\times 5$. (Pringle, Ariz.)



FIGURE 303.—*Pappophorum bicolor*, $\times 1$. (Griffiths 6291, Tex.)

40. ENNEAPOGON Desv. ex Beauv.

(Included in *Pappophorum* Schreb. in Manual, ed. 1)

Spikelets 3-flowered, the first floret fertile, the second smaller, sterile, the third rudimentary; glumes strongly 7-nerved; lemmas rounded on the back, firm, the truncate summit bearing 9 plumose equal awns; palea a little longer than the body of the lemma, the keels near the margin. Slender tufted perennials, with narrow feathery panicles. Type species *Enneapogon desvauxii* Beauv. Name from *ennea*, nine, and *pogon*, beard, alluding to the 9 plumose or bearded awns. A single species in America.

1. Enneapogon desvauxii Beauv.
SPIKE PAPPUSGRASS. (Fig. 304.) Culms numerous, slender, decumbent-spreading, 20 to 40 cm. tall, the nodes pubescent; blades flat to subinvolute, about 1 mm. wide; panicle spikelike, gray green or drab, mostly 2 to 5 cm. long, sometimes interrupted below; glumes longer than the body of the lemmas, 7-nerved, acuminate, pubescent; lemma of first floret (including awns) 4 to 5 mm. long, the body about 1.5 mm. long, villous, 9-nerved, the awns plumose, except at the apex.
2 (*Pappophorum wrightii* S.

Wats.)¹¹—Dry plains and stony hills, Utah and Texas to Arizona, south to Oaxaca, Peru, Bolivia, and Argentina. Cleistogamous spikelets are produced in the lower sheaths, the cleistogenes larger than the normal florets, but the awns almost wanting. The culms disarticulate at the lower nodes, carrying the cleistogenes with them. Furnishes a fair proportion of forage on sterile hills.

41. SCLEROPOGON Phil.

Plants monoecious or dioecious. Staminate spikelets several-flowered, pale, the rachilla not disarticulating; glumes about equal, membranaceous, long-acuminate, 1-nerved or obscurely 3-nerved, nearly as long as the first lemma; lemmas similar to the glumes, somewhat distant, 3-nerved or obscurely 5-nerved, mucronate; palea obtuse, shorter than the lemma. Pistillate spikelets subtended by a narrow bract on the pedicel, several-flowered, the upper florets reduced to awns, the rachilla disarticulating above the glumes but not separating between the florets or only tardily so; glumes acuminate, 3-nerved, with a few fine additional nerves, the first about half as long as the second; lemmas narrow, 3-nerved, the nerves extending into slender, scabrous, spreading awns, the florets falling together, forming a cylindric many-awned fruit, the lowest floret with a sharp-bearded callus as in *Aristida*; palea narrow, the 2 nerves near the margin, produced into short awns. Stoloniferous perennial, with short flexuous blades and narrow few-flowered racemes or simple panicles, the staminate and pistillate panicles strikingly different in appearance. Staminate and pistillate panicles may occur on the same plant, or rarely the 2 kinds of spikelets may be found in the same panicle. It may be that the seedlings produce 2 kinds of branches, each kind then re-

¹¹For an account of the genus and the identity of this species, see Chase, A., *Madroña* 7:187-189. 1946.



FIGURE 304.—*Enneapogon desvauxii*. Plant, $\times \frac{1}{2}$; spikelet, perfect floret, and cleistogene, $\times 5$. (Purpus 8272, Ariz.)

producing its own sex. This should be investigated. Type species, *Scleropogon brevifolius*. Name from Greek *skleros*, hard, and *pogon*, beard, allud-

ing to the hard awns.
1. *Scleropogon brevifolius* Phil.
BURRO GRASS (Fig. 305.) Culms erect, 10 to 20 cm. tall, tufted, producing



FIGURE 305.—*Scleropogon brevifolius*. Pistillate and staminate plants, $\times \frac{1}{2}$; pistillate spikelet, $\times 2$; pistillate and staminate florets, $\times 5$. (Zuck, Ariz.)

wiry stolons with internodes 5 to 15 cm. long; leaves crowded at the base, the blades flat, 1 to 2 mm. wide, sharp-pointed; racemes, excluding awns, 1 to 5 cm. long; staminate spikelets 2 to 3 cm. long; body of pistillate spikelets 2.5 to 3 cm. long, the awns 5 to 10 cm. long, loosely twisted. 24 (*S. karwinskyanus* Benth.)—Semiarid plains and open valley lands, Texas to Colorado, Nevada, and Arizona; south to central Mexico; Argentina. The mature pistillate spikelets

break away and with their numerous long spreading awns form “tumble-weeds” that are blown before the wind, the pointed barbed callus readily penetrating clothing or wool, the combined florets acting like the single floret of long-awned aristidas. Spikelets rarely staminate below and pistillate above. On overstocked ranges, where it tends to become established, it is useful in preventing erosion. Often important as a range grass, especially when young.

TRIBE 3. HORDEAE

42. AGROPYRON Gaertn. WHEATGRASS

Spikelets several-flowered, solitary (rarely in pairs), sessile, placed flatwise at each joint of a continuous (rarely disarticulating) rachis, the rachilla disarticulating above the glumes and between the florets; glumes equal, firm, several-nerved, rarely 2-nerved, 1-nerved, or nerveless, usually shorter than the first lemma, acute or awned, rarely obtuse or notched; lemmas convex on the back, rather firm, 5- to 7-nerved, acute or awned from the apex; palea about as long as the lemma. Perennials (our species except *Agropyron triticeum*), often with creeping rhizomes, with usually erect culms and green or purplish, usually erect, spikes. Type species, *Agropyron triticeum* Gaertn. Name from Greek *agrios*, wild, and *puros*, wheat, the two original species being weeds in wheatfields.

Most of the species of *Agropyron* furnish forage, and a few are among the most valuable range grasses of the Western States. In the valleys some species may grow in sufficient abundance to produce hay.

Agropyron trachycaulum (*A. tenerum*, *A. pauciflorum*) has been cultivated in the Northwestern States on a commercial scale under the name slender wheatgrass, and the seed has been carried by seedsmen in that region. *A. smithii*, western wheatgrass, sometimes called Colorado bluestem, is a source of hay in alkaline meadows through the Western States. *A. spicatum*, or blue-bunch wheatgrass, and *A. dasystachyum* are important range grasses in the Northwestern States. *A. trachycaulum* and *A. subsecundum* (*A. caninum*, so-called), because of their abundance in the mountain grazing regions, are also important. *A. repens*, quackgrass, is a good forage grass, but, because of its creeping rhizomes, is a troublesome weed, especially in the Eastern States where it is widely introduced. The species with strong creeping rhizomes are valuable for holding embankments and sandy soils.

The divisions of the species into those with rhizomes and those without is convenient and usually definite when the entire base is present, but some species normally without rhizomes (as *A. spicatum*) may rarely produce them and species in which rhizomes occur may not show them in herbarium specimens.

- 1a. Plants with creeping rhizomes.
- Lemmas awned, the awn divergent at maturity.

Lemmas pubescent.....

Lemmas glabrous.....

Lemmas awnless or with a short straight awn.

Glumes rigid, gradually tapering into a short awn.....

Glumes not rigid, acute or abruptly awn-pointed.....
9. A. ALBICANS.

10. A. GRIFFITHSII.

5. A. SMITHII.

Lemmas glabrous (sometimes pubescent in *A. riparium*).

Blades lax, flat.

Glumes shorter than the spikelets; rachilla glabrous..... 2. *A. REPENS*.

Glumes nearly as long as the spikelet; rachilla pubescent.

4. *A. PSEUDOREPENS*.

Blades firm, stiff, often involute.

Spikelets much compressed, closely imbricate, the spike dense.

3. *A. PUNGENS*.

Spikelets not much compressed, somewhat distant, the spike slender.

8. *A. RIPARIUM*.

Lemmas pubescent.

Spike 6 to 12 cm. long; spikelets 1 to 1.5 cm. long; glumes 6 to 9 mm. long.

6. *A. DASYSTACHYUM*.

Spike as much as 25 cm. long; spikelets as much as 2.5 cm. long; glumes to 13 mm.

long..... 7. *A. ELMERI*.

1b. Plants without creeping rhizomes.

Spikelets much compressed, crowded on the rachis..... 1. *A. DESERTORUM*.

Spikelets not much compressed nor divergent.

Spikelets awnless or awn-tipped only.

Glumes 2 to 2.5 mm. wide, nearly as long as the spikelet; rachilla villous.

Glumes with a broad subhyaline margin, unsymmetrical at the summit; lemmas commonly pubescent; spike rarely more than 7 cm. long, the spikelets closely imbricate..... 14. *A. LATIGLUME*.

Glumes not thin-margined; lemmas glabrous; spike 10 to 25 cm. long, the spikelets mostly scarcely or slightly imbricate..... 13. *A. TRACHYCAULUM*.

Glumes narrower, much shorter than the spikelet; rachilla scaberulous.

Blades involute (rarely flat)..... 19. *A. INNERME*.

Blades flat..... 21. *A. PARISHII*.

Spikelets awned.

Culms prostrate-spreading..... 17. *A. SCRIBNERI*.

Culms erect (decumbent at base in *A. pringlei*).

Rachis finally disarticulating.

Glumes narrow, 2-nerved; awns of lemmas spreading, out-curved or recurved.

22. *A. SAXICOLA*.

Glumes broader, with usually 3 to 5 distinct scabrous nerves; awn straight, 2 to 5 cm. long..... 23. *A. SAUNDERSII*.

Rachis continuous.

Awn straight or nearly so.

Spikelets about as long as the internodes of the rachis..... 21. *A. PARISHII*.

Spikelets imbricate, longer than the internodes of the rachis.

Lemmas coarsely pubescent..... 11. *A. VULPINUM*.

Lemmas glabrous or scabrous toward summit only.

12. *A. SUBSECUNDUM*.

Awn divergent, when dry.

Spikelets imbricate..... 15. *A. BAKERI*.

Spikelets distant.

Spikelets 3 to 7 in a spike, about twice as long as the internode; spike 4 to 7 cm. long..... 16. *A. PRINGLEI*.

Spikelets mostly more than 7 in a spike, usually shorter than the internode; spike mostly more than 8 cm. long.

Spike 8 to 15 cm. long; blades 1 to 2 mm. wide..... 18. *A. SPICATUM*.

Spike 15 to 30 cm. long; blades 4 to 6 mm. wide..... 20. *A. ARIZONICUM*.

1. *Agropyron desertorum* (Fisch.)

Schult. (Fig. 306.) Culms slender, erect or geniculate at base, in dense tufts, 25 to 100 cm. tall; sheaths glabrous or the lower spreading-hirsute; blades 2 to 4 mm., occasionally to 5 mm. wide; spike 5 to 9 cm. long, 7 to 11 mm. wide, somewhat bristly, the short-jointed rachis pubescent; spikelets closely spaced on the rachis, 8 to

12 mm. long, 5- to 7-flowered, somewhat spreading; glumes and lemmas firm, glabrous to sparsely ciliate on the keel, both abruptly narrowed into an awn 2 to 3 mm. long, the lemma about 6 mm. long, the awn commonly slightly bent to one side. 24 ("A. *cristatum*" of Manual, ed. 1)—Grown in experiment stations and found here

and there in grainfields, Ontario, North Dakota, South Dakota, Montana, Wyoming, Colorado, Utah, Nevada, Arizona, and California; adventive, Albany Port, N. Y. Introduced from Russia, extensively planted in the northern Great Plains area, and spreading readily by re-seeding.

***Agropyron cristátum* (L.) Gaertn.** CRESTED WHEATGRASS. Spike 2 to 7 cm. long; spikelets more widely spreading, the glumes somewhat contorted, gradually tapering into the awns, these curved, 2 to 5 mm. long. ♀ —Adventive on barrier beach, Fishers Island, N. Y.; Barton, N. Dak. Introduced from Russia, grown in experiment stations, and a valuable dry-land grass for soil conservation and forage in the northern Great Plains. Sometimes found mixed in plantings of *A. desertorum*.

***Agropyron sibiricum* (Willd.) Beauv.** Rather smaller with relatively scant foliage; spike 6 to 10 cm. long, the rachis glabrous or nearly so; spikelets somewhat spreading, about as in *A. desertorum*, the glumes and lemmas mucronate or with an awn 1 to 2 mm. long. ♀ —Introduced from Russia, grown in a few experiment stations, spontaneous in Idaho (near Boise) and New Mexico (near Gallup). Better suited to dry soils.

***Agropyron triticeum* Gaertn.** Annual, branching at base; culms slender, erect or usually decumbent, mostly 10 to 30 cm. tall; blades flat, mostly less than 10 cm. long, 2 to 3 mm. wide; spike oval or ovate, 1 to 1.5 cm. long, thick; spikelets crowded, about 7 mm. long; glumes and lemmas acuminate. ☉ —Absaroka Forest, Mont., Wyoming, Mountain Home, Idaho; Corfu, Wash. Sparingly introduced from southern Russia.

2. *Agropyron répens* (L.) Beauv. QUACKGRASS. (Fig. 307, A.) Green or glaucous; culms erect or curved at base, 50 to 100 cm. tall, sometimes taller, with creeping yellowish rhizomes; sheaths of the innovations



FIGURE 306.—*Agropyron desertorum*, × 1. (Ball 1768, Colo.)

often pubescent; blades relatively thin, flat, usually sparsely pilose on the upper surface, mostly 6 to 10 mm. wide; spike 5 to 15 cm. long, the rachis scabrous on the angles; spikelets mostly 4- to 6-flowered, 1 to 1.5 cm. long, the rachilla glabrous or scabrous; glumes 3- to 7-nerved, awn-pointed; lemmas mostly 8 to 10 mm. long, the awn from less than 1 mm. to as long as the lemma; palea obtuse, nearly as long as the lemma, scabrous on the keels. ♀ —Waste places, meadows and pastures, Newfoundland to Alaska (Skagway), south to North Carolina, Arkansas, Utah, and California; Mexico; introduced from Eurasia. Common in the Northern States; a troublesome weed in cultivated ground. Called also quitch grass and couch grass. Awned specimens have been described as *Agropyron leersianum* (Wulf.) Rydb.; also referred to *A. repens* f. *aristatum* (Schum.) Holmb.

3. *Agropyron púngens* (Pers.) Roem. and Schult. (Fig. 307, B.) Glaucous, culms 50 to 80 cm. tall,

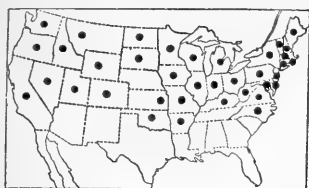


FIGURE 307.—A, *Agropyron repens*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 3$. B, *A. pungens*, $\times 3$. (Scribner, Maine.)

with pale or brownish rhizomes; blades firm, mostly involute, scabrous on the upper surface; spikelets awnless, compressed, often as much as 10-

flowered, the florets closely imbricate; glumes firm, acute, obscurely nerved, scabrous on the keel. 2l —Seacoast, Maine (Cape Elizabeth), Mas-

sachusetts (Harwich); ballast, New Jersey and Oregon; introduced from Europe.

4. *Agropyron pseudorépens* Scribn. and Smith. (Fig. 308.) Resembling *A. repens*, often stouter, the rhizomes not yellow; blades commonly narrower; spike 10 to 20 cm. long, the spikelets contracted and appressed, the flat or scarcely keeled glumes 2 to 2.5 mm. wide, nearly equaling the spikelets; lemmas scaberulous to minutely hispidulous, rachilla villous. 21 —Mostly in bottom lands or valleys, Alberta; Michigan (south shore of Lake Superior); South Dakota and Nebraska to Washington, south to New Mexico and Arizona. Specimens without rhizomes resemble *A. trachycaulum*.

5. *Agropyron smithii* Rydb. WESTERN WHEATGRASS. (Fig. 309.) Usually glaucous; culms erect, 30 to 60 cm. tall, sometimes taller, with creeping rhizomes; sheaths glabrous; blades firm, stiff, mostly flat when fresh, involute in drying, strongly nerved, scabrous or sometimes sparsely villous on the upper surface, mostly 2 to 4 mm. wide, tapering to a sharp point; spike erect, mostly 7 to 15 cm. long, the rachis scabrous on the

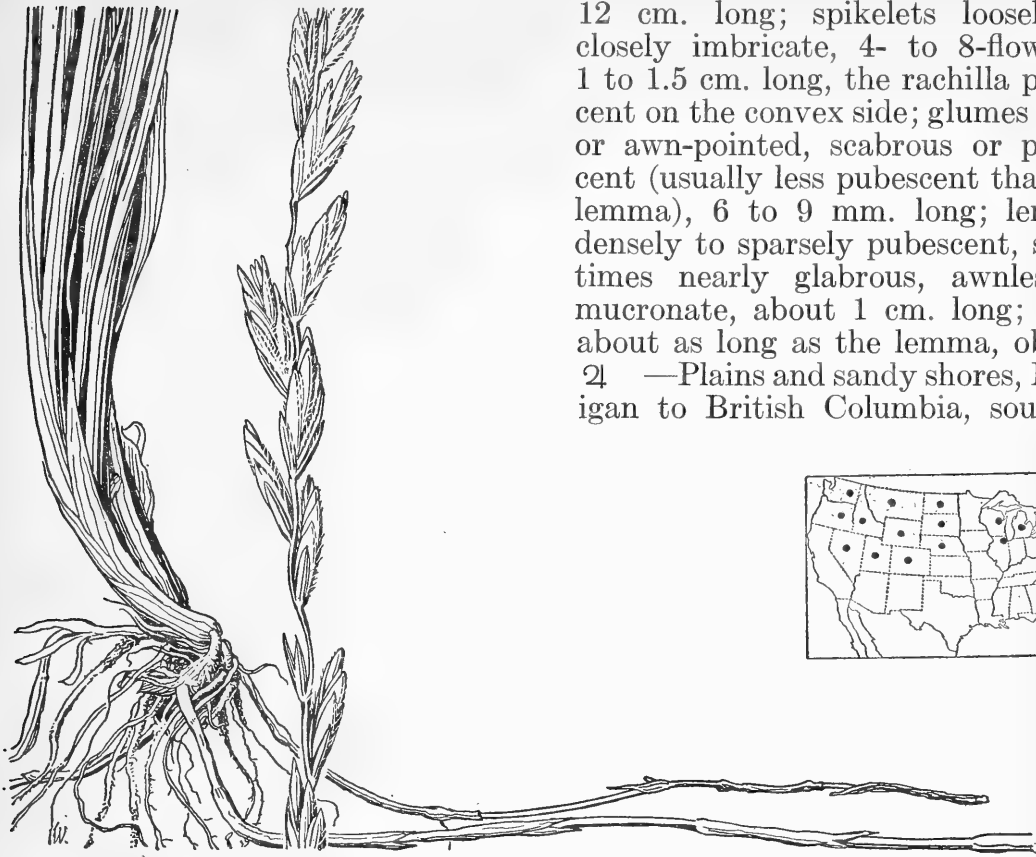


FIGURE 308.—*Agropyron pseudorepens*, $\times 1$. (Chase 5389, Colo.)

angles; spikelets rather closely imbricate, occasionally two at a node, 6- to 10-flowered, 1 to 2 cm. long, the rachilla scabrous or scabrous-pubescent; glumes rigid, tapering to a short awn, rather faintly nerved, 10 to 12 mm. long; lemmas about 1 cm. long, firm, glabrous, often pubes-



FIGURE 309.—*Agropyron smithii*, $\times 1$. (Nelson 3918, Wyo.)

FIGURE 310.—*Agropyron dasystachyum*, $\times 1$. (Griffiths 488, Wash.)

cent near the base, obscurely nerved, acuminate, mucronate, sometimes short-awned; palea scabrous-pubescent on the keels. 21 —Moist, usually alkaline soil, Ontario to Alberta and British Columbia; New York; Michigan to Washington, south to Tennessee, Texas, Arizona, and northeastern California; mostly introduced east of Iowa and Kansas. Two varieties have been recognized. *AGROPYRON SMITHII* var. *MÖLLE* (Scribn. and Smith) Jones. Lemmas and sometimes glumes more or less pubescent. 21 —About the same range as the species. *AGROPYRON SMITHII* var. *PALMÉRI* (Scribn. and Smith) Heller. Lower sheaths pubescent. 21 —Colorado to Utah, south to New Mexico and Arizona.

6. *Agropyron dasystachyum* (Hook.)
Scribn. THICKSPIKE WHEATGRASS.
(Fig. 310.) Often glaucous; culms mostly 40 to 80 cm. tall, with creeping rhizomes; blades flat to involute, 1 to 3 mm. wide; spike mostly 6 to

12 cm. long; spikelets loosely to closely imbricate, 4- to 8-flowered, 1 to 1.5 cm. long, the rachilla pubescent on the convex side; glumes acute or awn-pointed, scabrous or pubescent (usually less pubescent than the lemma), 6 to 9 mm. long; lemmas densely to sparsely pubescent, sometimes nearly glabrous, awnless or mucronate, about 1 cm. long; palea about as long as the lemma, obtuse. 21 —Plains and sandy shores, Michigan to British Columbia, south to

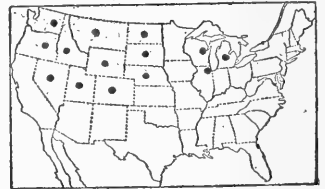
FIGURE 311.—*Agropyron elmeri*, $\times 1$. (Type.)



FIGURE 312.—*Agropyron riparium*, $\times 1$. (Nelson 3965, Wyo.)

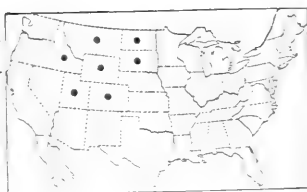


FIGURE 313.—*Agropyron albicans*, $\times 1$. (Griffiths 3013, Wyo.)

Illinois, Nebraska, Colorado, Nevada, and Oregon. In the form growing on the sandy shores of Lake Michigan the lemmas are densely villous, but villous forms occur in other parts of the range of the species.

This and the four following species appear to intergrade, forming a polymorphous group.

7. *Agropyron elméri* Scribn. (Fig. 311.) Resembling *A. dasystachyum*; culms on the average taller, more robust, the spike longer (as much as 25 cm. long), the spikelets larger (as much as 10-flowered and 2.5 cm. long); glumes and lemmas usually longer (as much as 12 mm. and 15 mm., respectively); lemmas pubescent, sometimes sparsely so or scabrous only or pubescent only on the margins at base. ♀ —Dry or sandy soil, British Columbia to Oregon.

8. *Agropyron riparium* Scribn. and Smith. STREAMBANK WHEATGRASS. (Fig. 312.) Resembling *A. dasystachyum*, with vigorous rhizomes; blades usually narrower; spikelets usually more imbricate; lemmas glabrous or somewhat pubescent along the edges of the lower part of the lemma. ♀ —Dry or moist meadows and hills, North Dakota to Alberta and Washington, south to Oregon and Colorado.

9. *Agropyron álbian* Scribn. and Smith. (Fig. 313.) Similar to *A. dasystachyum*; glumes awn-pointed, about 1 cm. long; awn of lemma 1 to 1.5 cm. long, divergent when dry. 2 —Plains and dry hills, South Dakota to Alberta and Idaho, Colorado and Utah.

10. *Agropyron griffithsi* Scribn. and Smith ex Piper. (Fig. 314.) Resembling *A. albicans*, differing chiefly in having glabrous lemmas, the rachis rarely disarticulating. 2 —Open, dry, sandy or alkaline soil, western North Dakota to Washington, south to Wyoming and Colorado. In the type specimen the lemmas are smooth, but in several other specimens the lemmas are scabrous. Possibly only a glabrous form of *A. albicans*.

Agropyron intermédium (Host) Beauv. Blades short, involute, acutish; glumes about 5-nerved; lemmas awnless. 2 —Ballast at Camden, N. J.; adventive from Europe. Planted in the Northwest for pastures and for revegetating range lands.

Agropyron trichóphorum (Link) Richt. Blades flat; spikelets pubescent, awnless; glumes several-nerved, acutish. 2 —Lynn, Mass.; adventive from Europe. Planted to some extent in the Northwest.

Agropyron júnceum (L.) Beauv. Blades loosely involute; spikelets glabrous; glumes 9-nerved, acutish. 2 —Ballast near Portland, Oreg.; dunes, San Francisco, Calif.; adventive from Europe.

11. *Agropyron vulpínium* (Rydb.) Hitchc. (Fig. 315.) Culms 50 to 75 cm. tall, somewhat geniculate at base; blades drying loosely involute, 10 to 12 cm. long, 2 to 4 mm. wide; spike nodding, 10 to 15 cm. long, the rachis stiffly scabrous-ciliate on the angles; spikelets imbricate but not appressed, some toward the base two at a node, 3- to 5-flowered, the rachilla appressed-pubescent; glumes scabrous, strongly 5-nerved, awn-tipped; lemmas 5-nerved toward the

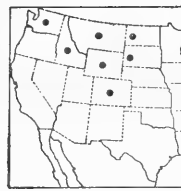


FIGURE 314.—*Agropyron griffithsi*, $\times 1$. (Williams and Griffiths 164, Wyo.)



FIGURE 315.—*Agropyron vulpinum*, $\times 1$. (Type.)

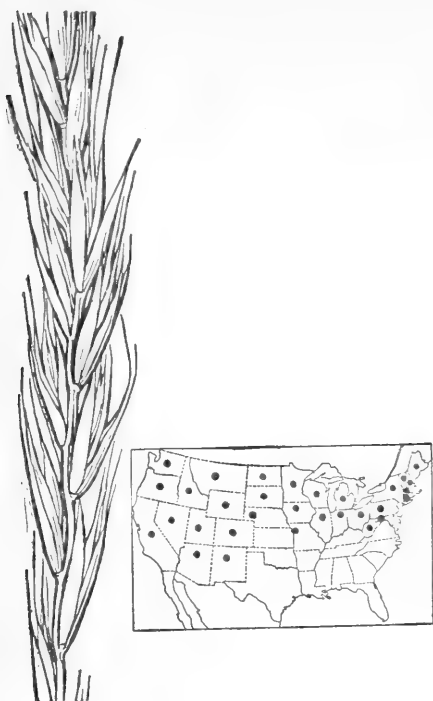


FIGURE 316.—*Agropyron subsecundum*,
× 1. (Shear 452, Mont.)



FIGURE 317.—*Agropyron trachycaulum*, × 1. (Shear 404.)

minutely toothed apex, coarsely pubescent, the scabrous awn 8 to 10 mm. long. ♀ (*Elymus vulpinus* Rydb.) —Moist ground, Grant County, Nebr. and Livingston, Mont.

12. *Agropyron subsecundum* (Link) Hitchc. BEARDED WHEATGRASS. (Fig. 316.) Green or glaucous, without creeping rhizomes; culms erect, tufted, 50 to 100 cm. tall; sheaths glabrous or rarely pubescent; blades flat, 3 to 8 mm. wide; spike erect or slight-

ly nodding, 6 to 15 cm. long, sometimes unilateral from twisting of the spikelets to one side, the rachis scabrous or scabrous-ciliate on the angles, sometimes disarticulating; spikelets rather closely imbricate, few-flowered, the rachilla villous, the callus of the florets short-pilose; glumes broad, rather prominently 4- to 7-nerved, nearly as long as the spikelet, tapering into an awn; lemmas obscurely 5-nerved, the nerves becoming prominent toward the tip, the awn straight or nearly so, usually 1 to 3 cm. long. ♀ —Moist meadows and open woods, Newfoundland to Alaska, south to the mountains of Maryland, west to Washington and California, and south to New Mexico and Arizona. Said by Malte to be self-pollinated. This is the species which has generally been called by American botanists *A. caninum* (L.) Beauv.; that is a European species, differing in having 3-nerved glumes.

AGROPYRON SUBSECUNDUM var. **ANDINUM** (Scribn. and Smith) Hitchc. Culms mostly not more than 50 cm. tall, loosely tufted, usually geniculate at base; lower sheaths pale, usually papery; spike short; awns mostly 5 to 10 mm. long, often curved. An alpine form of mountain meadows. ♀ —Montana to Washington, south to Colorado and Nevada.

***Agropyron caninum* (L.) Beauv.** Glumes 3-nerved. ♀ —Ballast near Portland, Oreg.; adventive from Europe.

13. *Agropyron trachycaulum* (Link) Malte. SLENDER WHEATGRASS. (Fig. 317.) Resembling *A. subsecundum*; sheaths glabrous or rarely pubescent; blades mostly 2 to 4 mm. wide; spike usually more slender, 10 to 25 cm. long, sometimes unilateral; spikelets from rather remote to closely imbricate; glumes and lemmas awnless or nearly so. ♀ (*A. tenerum* Vasey, *A. pauciflorum* (Schwein.) Hitchc.)—Labrador to Alaska, south to the mountains of West Virginia, Missouri, New Mexico, and California; north-

western Mexico. Alpine plants lower, and with shorter denser commonly purplish spikes, resemble *A. subsecundum* var. *andinum*, but the spikelets are awnless. They have been referred to *A. violaceum* (Hornem.) Lange, an Arctic species, and to *A. biflorum* (Brignoli) Roem. and Schult.



FIGURE 318.—*Agropyron latiglume*, $\times 3$. (Type.)

14. *Agropyron latiglume* (Scribn. and Smith) Rydb. (Fig. 318.) Culms loosely tufted, curved or geniculate below, 20 to 50 cm. tall; blades flat, short, 3 to 5 mm. wide, short-hirsute on both surfaces, rarely glabrous or nearly so beneath; spike mostly 3 to 7 cm. long, rarely longer; spikelets usually closely imbricate; glumes broad, flat, thin-margined, unsymmetrical and slightly notched at summit, awn-tipped; lemmas commonly appressed-pubescent, awnless or awn-tipped. 21 —Alpine meadows, open slopes, mostly at high altitudes, Montana, Wyoming, and Colorado to Labrador and Alaska.

15. *Agropyron bakéri* E. Nels. BAKER WHEATGRASS. (Fig. 319.) Resembling *A. subsecundum*; culms erect, mostly 50 to 100 cm. tall, rather loosely tufted; spike mostly 5 to 12 cm. long, the spikelets rather loosely imbricate; awns divergently curved when dry, 1 to 4 cm. long. 21 —Open slopes, upper altitudes, northern Michigan; Alberta to Washington, Oregon, and New Mexico.

16. *Agropyron pringlei* (Scribn. and Smith) Hitchc. (Fig. 320.) Culms tufted, decumbent at base, 30 to 50

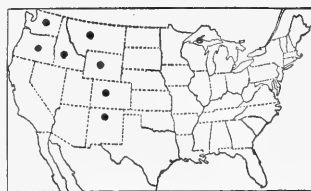


FIGURE 319.—*Agropyron bakéri*, $\times 1$. (Hitchcock 1686, Colo.)

cm. tall, the basal sheaths soft and papery; blades flat or loosely involute, mostly less than 10 cm. long, 1 to 3 mm. wide; spike more or less flexuous, 4 to 7 cm. long, the rachis scabrous on the angles, slender, the middle internodes usually 8 to 10 mm. long; spikelets mostly 3 to 7 in each spike, rather distant, the lower and middle ones (excluding awns) about as long as two internodes, mostly 3- to 5-flowered, the rachilla joints minutely



FIGURE 320.—*Agropyron pringlei*, $\times 1$. (Pringle 504, Calif.)



scabrous, about 2 mm. long; glumes rather narrow, about 3-nerved on the exposed side, 7 to 8 mm. long, tapering into a straight awn about 5 mm. long; lemmas tapering into a scabrous, strongly divergent awn 1.5 to 2.5 cm. long; palea 10 to 12 mm. long. 2 —Stony slopes, 2,500 to 3,500 m., in the Sierra Nevada, Calif.

17. *Agropyron scribnéri* Vasey. SPREADING WHEATGRASS. (Fig. 321) Culms tufted, prostrate or decumbent-spreading, often flexuous, 20 to 40 cm. long; blades flat or, especially on the innovations, loosely involute, more or less pubescent, mostly basal, the 2 or 3 culm blades usually less than 5 cm. long, 1 to 3 mm. wide; spike long-exserted, often nodding or flexuous, dense, 3 to 7 cm. long, the rachis disarticulating at maturity, the internodes glabrous, 3 to 5 mm. long, or the lowermost longer; spikelets 3- to 5-flowered, the rachilla internodes minutely scabrous, about 2 mm. long; glumes narrow, one obscurely nerved, the other with 2 or 3 distinct nerves, tapering into a divergent awn similar to the awns of the lemmas; lemmas nerved toward the tip, tapering to a strongly divergent awn 1.5 to 2.5 cm. long; palea a little longer than the body of the lemma, the apex with 2 short slender teeth. 2 —Alpine slopes, 3,000 to 4,000 m., Montana and Idaho to New Mexico and California. Characterized by the hard leafy basal tussock with slender spreading flexuous culms.

18. *Agropyron spicatum* (Pursh) Scribn. and Smith. BLUEBUNCH WHEATGRASS (Fig. 322.) Green or glaucous; culms tufted, often in large bunches, erect, 60 to 100 cm. tall; sheaths glabrous; blades flat to loosely involute, 1 to 2 mm., sometimes to 4 mm., wide, glabrous beneath, pubescent on the upper surface; spike slender, mostly 8 to 15 cm. long, the rachis scaberulous on the angles, the internodes 1 to 2 cm. long, or the

FIGURE 321.—*Agropyron scribnéri*, $\times 1$. (Shear 1179, Colo.)

lowermost 2.5 cm.; spikelets distant, not as long (excluding the awns) as the internodes or slightly longer, mostly 6- to 8-flowered, the rachilla joints scaberulous, 1.5 to 2 mm. long; glumes rather narrow, obtuse to acute, rarely short-awned, about 4-nerved, usually about half as long as the spikelet, glabrous or scabrous on the nerves; lemmas about 1 cm. long, the awn strongly divergent, 1 to 2 cm. long; palea about as long as the lemma, obtuse. 21 —Plains, dry slopes, canyons and dry open woods, northern Michigan to Alaska, south to western South Dakota, New Mexico, and California. A smaller form with smaller spikelets, found in desert regions of the Great Basin has been differentiated as *A. vaseyi* Scribn. and Smith. *A. SPICATUM* var. *PUBÉSCENS* Elmer. Culms and foliage pubescent. 21 —Washington and Idaho.



FIGURE 322.—*Agropyron spicatum*, $\times 1$. (Vasey, Wash.)



FIGURE 323.—*Agropyron inerme*, $\times 1$. (Horner 571, Wash.)

19. *Agropyron inerme* (Scribn. and Smith) Rydb. BEARDLESS WHEAT-GRASS. (Fig. 323.) Differing from *A. spicatum* in the awnless spikelets. 21 (*A. spicatum* var. *inerme* Heller.)—Dry plains and hills, Montana to British Columbia, south to Utah, Wyoming, western Nebraska, and eastern Oregon; Texas. Closely related to *A. spicatum*, but very different in appearance because awnless.



FIGURE 324.—*Agropyron arizonicum*, $\times 1$. (Type.)

20. *Agropyron arizonicum* Scribn. and Smith. (Fig. 324.) Resembling *A. spicatum*, usually taller and coarser;

FIGURE 325.—*Agropyron parishii*, × 1. (Type.)FIGURE 326.—*Agropyron saxicola*, × 1. (Type.)

blades commonly 4 to 6 mm. wide; spike 15 to 30 cm. long, flexuous, the rachis more slender; spikelets distant, mostly 3- to 5-flowered; glumes short-awned; awns of the lemmas stouter, mostly 2 to 3 cm. long. ♀ —Rocky slopes, western Texas, New Mexico, Arizona, Nevada, California (Eel Ridge), and Chihuahua, Mexico.

Agropyron semicostatum (Steud.) Nees ex Boiss. Blades flat; spike nodding, 10 to 20 cm. long; spikelets several-flowered, imbricate; glumes several-nerved, much shorter than the spikelet, acute but scarcely awned,

awn of lemma flexuous or finally divergent, 1.5 to 3 cm. long. ♀ —Ballast near Portland, Oreg. Native of Asia. Cultivated in experiment plots in California, Washington, D. C., and Mississippi in the last century under the unpublished name *Agropyron japonicum*. Tracy used the name in print in economic notes. (See Synonymy.)

21. *Agropyron parishii* Scribn. and Smith. (Fig. 325.) Culms 70 to 100 cm. tall, the nodes retrorsely pubescent; blades flat or loosely involute, 2 to 4 mm. wide; spike slender, nodding, 10 to 25 cm. long, the internodes of the rachis 1.5 to 2.5 cm. long; spikelets 4- to 7-flowered, mostly about 2 cm. long, narrow, appressed, the rachilla joints scaberulous, about 2 mm. long; glumes 3- to 5-nerved, 1 to 1.5 cm. long, acute; lemmas acute or with a slender awn 1 to 8 mm. long; palea as long as the lemma, obtuse. ♀ —Canyons and rocky slopes, California (Monterey and San Benito Counties and San Bernardino Mountains); rare. *AGROPYRON PARISHII* var. *LAÉVE* Scribn. and Smith. Nodes glabrous; awns usually 1 to 2 cm. long. ♀ —California, more widespread than the species.

22. *Agropyron saxicola* (Scribn. and Smith) Piper. (Fig. 326.) Culms tufted, erect, 30 to 80 cm. tall; sheaths glabrous or sometimes pubescent; blades flat to loosely involute, glabrous or sometimes pubescent, 1 to 4 mm. wide; spike 5 to 12 cm. long, the rachis tardily disarticulating, the internodes more or less scabrous on the angles, 5 to 10 mm. long; spikelets imbricate, sometimes in pairs, about twice as long as the internodes of the rachis, 4- to 6-flowered, the rachilla minutely scabrous; glumes narrow, 2-nerved, the nerves sometimes obscure, sometimes with a third faint nerve, awned, the awn divergent, 5 to 20 mm. long, sometimes with a tooth or short awn at the base of the main awn; lemmas about 8 mm. long, the awn divergent, mostly 2 to 5 cm. long, sometimes with 1 or 2 short ad-

ditional awns; palea about as long as the lemma, obtuse or truncate. 2l —Dry or rocky slopes and plains, western South Dakota to Washington, south to Utah, Arizona, and California.

23. *Agropyron saundersii* (Vasey) Hitchc. (Fig. 327.) Culms erect, 60 to 100 cm. tall; blades flat or loosely involute; spike erect, 8 to 15 cm. long, mostly purplish, the rachis tardily disarticulating; spikelets sometimes in pairs near the middle of the spike, 1 to 1.5 cm. long (excluding awns), 2- to 5-flowered; glumes variable, narrow with 2 nerves or wider with 3 to 5 nerves, the nerves strong and at least the midnerve scabrous, the awn 1 to 5 cm. long, sometimes with a short lateral awn near the base; lemmas scabrous, the awn straight, 2 to 5 cm. long. 2l (*Elymus saundersii*



FIGURE 327.—*Agropyron saundersii*, $\times 1$. (Type.)

Vasey.)—Dry slopes, Colorado, Wyoming, Idaho, Utah, Arizona, and California. Only the 5 specimens of the type collection from Veta Pass, Colo., have spikelets with awns to 5 cm. long. In some specimens the awns of the glumes vary from 5 to 16 mm. and those of the lemmas from 7 to 30 mm. (*Elymus saundersii* var.

californicus Hoover), and in others from 10 to 20 mm. on the glumes and 15 to 35 mm. on the lemmas.

43. TRITICUM L.

Spikelets 2- to 5-flowered, solitary, placed flatwise at each joint of a continuous or articulate rachis, the rachilla disarticulating above the glumes and between the florets or continuous; glumes rigid, keeled, 3- to several-nerved, the apex abruptly mucronate or toothed or with one to several awns; lemmas broad, keeled, very asymmetric, many-nerved, abruptly pointed or awned. Low or rather tall annuals, with flat blades and thick spikes. Standard species, *Triticum aestivum*. *Triticum*, the old Latin name for wheat.

1. *Triticum aestivum* L. WHEAT. (Fig. 328.) Culms erect, freely branching at base, 60 to 100 cm. tall; blades 1 to 2 cm. wide; spike mostly 5 to 12 cm. long; internodes of rachis 3 to 6 mm. long; spikelets broad, glabrous or pubescent, long-awned to awnless; glumes usually strongly keeled toward one side, the keel extending into a mucro, the other side usually obtusely angled at apex. ☉ (*T. vulgare* Vill.; *T. sativum* Lam.)—Commonly cultivated; fields and waste places in the vicinity of cultivated fields or grain elevators, but not established.

Spelt (*T. spelta* L.) and emmer (*T. dicoccum* Schrank) are sometimes cultivated for the grain, used for stock feed, and for forage. In these two species the rachis breaks up, each joint bearing a spikelet which remains entire, each floret permanently enclosing the grain. In spelt the spikelets are somewhat distant, exposing the rachis, in emmer the spikelets are closely imbricate, scarcely exposing the rachis. A large number of varieties of wheat are in cultivation; the lemmas may be glabrous or pubescent, the awns long or nearly or quite wanting.

On the basis of the number of chromosomes the wheats and their



FIGURE 328.—*Triticum aestivum*. Plant with awned spikes (bearded wheat) and a nearly awnless spike (beardless wheat), $\times \frac{1}{2}$; spikelet and floret, $\times 3$. (Cult.)

allies may be divided into three groups. The group with 7 chromosomes (probably the most primitive) includes einkorn (*T. monococcum* L.). The group with 14 chromosomes includes durum wheat (*T. durum* Desf.), poulard wheat (*T. turgidum* L.), Polish wheat (*T. polonicum* L.), emmer (*T. dicoccum* Schrank), and also *T. pyramidale* Perciv., *T. orientale* Perciv. (not Biebers. 1806), *T. persicum* Vavilov (not Aitch. and Hemsl. 1888), *T. dicoccoides* Koern. and *T. timopheevi* (Zhukov.) Zhukov.¹² The group with 21 chromosomes includes spelt and the commonly cultivated wheats referred to as *T. vulgare* Vill. and *T. compactum* Host,

also *T. macha* Dekap. and Menab. and *T. sphaerococcum* Perciv.¹² Alaska wheat is a variety of poulard wheat with branched heads. It is also known by several other names, such as Egyptian, miracle, and mummy. This variety is considered inferior commercially to standard varieties of wheat. Stories of varieties originating from seed found with mummies 3,000 years old have no basis in fact.

The origin of wheat is not known, as there is no native species like any of the cultivated forms. Some botanists have suggested species of *Aegilops* and others *T. dicoccoides* Koern., a wild species of Palestine, as the possible ancestor.

44. AEGILOPS L. GOATGRASS

Spikelets 2- to 5-flowered, solitary, turgid or cylindric, placed flatwise at each joint of the rachis and fitting into it, the joints thickened at the summit, the spikelets usually not reaching the one above on the same side, exposing the rachis; spike usually disarticulating near the base at maturity, falling entire, or finally disarticulating between the spikelets. Annuals with flat blades and usually awned spikes. Type species, *Aegilops ovata*. Name from *Aegilops*, an old Greek name for a kind of grass.

The species of *Aegilops* have been recently introduced into the United States and in some places are becoming troublesome weeds. At maturity the spikes fall entire, the lowest rachis joint serving as a pointed callus to the 2- to several-jointed, strongly barbed fruits, which work their way into the mouths and noses of grazing animals and into the wool of sheep.

| | |
|--|--------------------|
| Spikelets subovate; rachis not disarticulating..... | 3. A. OVATA. |
| Spikelets cylindric; rachis finally disarticulating..... | |
| Glumes with 1 awn..... | 1. A. CYLINDRICA. |
| Glumes with 3 awns..... | 2. A. TRIUNCIALIS. |

1. *Aegilops cylindrica* Host.

JOINTED GOATGRASS. (Fig. 329.) Culms erect, branching at base, 40 to 60 cm. tall; blades 2 to 3 mm. wide; spike cylindric, 5 to 10 cm. long; internodes of rachis 6 to 8 mm. long; spikelets 8 to 10 mm. long, glabrous to hispid; glumes several-nerved, keeled at 1 side, the keel extending into an awn, the main nerve of the other side extending into a short tooth; lemmas mucronate, those of the uppermost spikelets awned like the glumes; awns very scabrous, those of the upper spikelets about 5 cm.

long, those of the lower spikelets progressively shorter. ☉ —Weed in wheatfields, and waste places, New York, and Pennsylvania; Indiana to Wyoming and Utah, south to Texas and New Mexico; Washington; recently introduced from Europe.

2. *Aegilops triuncialis* L. BARB GOATGRASS. (Fig. 330.) Culms branching and spreading at base, 20 to 40 cm. tall; blades rather rigid, sharp-pointed, spreading; spike 3 to 4 cm. long, 2 or 3 of the lower spikelets often reduced, the fertile spikelets 3 to 5; glumes with 3 strong scabrous, somewhat spreading awns, 4 to 8

¹² These names supplied by W. J. Sando, geneticist.



FIGURE 329.—*Aegilops cylindrica*, $\times \frac{1}{2}$. (Bush 72148, Mo.)

cm. long; lemmas with three rigid unequal awns. ☉ —Troublesome weed on range land, California; adventive in Pennsylvania; introduced from Europe.

3. *Aegilops ováta* L. Culms tufted, geniculate at base, 15 to 25 cm. tall; blades short, sharp-pointed; spike thick, of 2 to 4 subovate spikelets, the upper sterile; glumes with 4 stiff scabrous spreading awns 2 to 3 cm. long; lemmas usually with 1 long and 2 short awns. ☉ —Weed in fields, California and Virginia; introduced from Europe.

45. SECÁLE L. RYE

Spikelets usually 2-flowered, solitary, placed flatwise against the rachis, the rachilla disarticulating above the glumes and produced beyond the upper floret as a minute stipe; glumes narrow, rigid, acuminate or subulate-pointed; lemmas broader, sharply keeled, 5-nerved, ciliate on the keel and exposed margins, tapering into a long awn. Erect, mostly annual grasses, with flat blades and dense spikes. Type species, *Secale cereale*. *Secale*, the old Latin name for rye.

1. *Secale cereále* L. RYE. (Fig. 331.) In habit resembling wheat, but usually taller, the spike more slender, somewhat nodding, on the average longer. ☉ —Commonly cultivated; escaped from cultivation, in fields and waste places. This species is thought to be derived from *S. montanum* Guss., a perennial native in the mountains of southwestern Asia.

***Secale montánum* Guss.** Culms in rather large dense clumps, erect or geniculate at the base, mostly 100 to 135 cm. tall; blades flat, stiffly spreading; spikes somewhat drooping, 10 to 13 cm. long, the rachis rather readily disarticulating; awns 1 to 2 cm. long, slender, scabrous. ☉ —Persisting along roadsides around the experiment station at Pullman, Wash. Introduced from southwestern Asia.



FIGURE 330.—*Aegilops triuncialis*, $\times \frac{1}{2}$. (Cole, Calif.)

46. *ÉLYMUS* L. WILD-RYE

Spikelets 2- to 6-flowered, in pairs (3 or more or solitary sometimes in a few species) at each node of a usually continuous rachis, placed as in *Agropyron* but the rachilla distorted at base, bringing the florets more or less dorsiventral to the rachis; rachilla disarticulating above the glumes and between the florets; glumes equal, somewhat asymmetric, usually rigid, sometimes indurate below, narrow to subulate, 1- to several-nerved, acute to aristate; lemmas rounded on the back or nearly terete, obscurely 5-nerved, acute or usually



FIGURE 331.—*Secale cereale*. Plant, $\times \frac{1}{2}$; spikelet, $\times 3$; floret, $\times 5$. (Hill, Ill.)

awned from the tip. Erect, usually rather tall perennials (one annual), with flat or rarely convolute blades and slender or bristly spikes, the spikelets usually crowded, sometimes somewhat distant. Type species, *Elymus sibiricus* L. Name from *Elumos*, an old Greek name for a kind of grain. The species in which the spikelets are mostly solitary can be distinguished from *Agropyron* by the narrow or subulate glumes. The seed of certain species (e.g., *E. mollis* and *E. canadensis*) have been used for food by the Indians.

The species of *Elymus* are for the most part good forage grasses and in some localities form a part of the native hay. In the wooded areas of the Northwest, *E. glaucus* is one of the valuable secondary grasses of the ranges. The species with creeping rhizomes are likely to be of value as soil or sand binders. *E. mollis* is a natural sea-dune grass, and *E. arenicola* and *E. flavescens* are common on inland shifting dunes. *E. triticoides* is to be recommended for holding embankments. On the western ranges *E. cinereus* and *E. triticoides* are important.

1a. Plants annual; spike long-awned, nearly as broad as long..... 1. *E. CAPUT-MEDUSAE*.
1b. Plants perennial; spike much longer than broad.

2a. Rhizomes present, slender, creeping.

Glumes lanceolate, awnless or awn-pointed. Plants of coastal dunes.

Glumes and lemmas papery, distinctly nerved..... 2. *E. MOLLIS*.

Glumes and lemmas firm, faintly nerved (lemmas nerved at apex).

3. *E. VANCOUVERENSIS*.

Glumes subulate or very narrow.

Spikelets glabrous.

Lemmas acute or awn-pointed, brownish or tan-colored; spikelets paired or solitary, crowded.

Spikelets usually in pairs, or paired and solitary in a single spike; culms 60 to 120 cm. tall..... 8. *E. TRITICOIDES*.

Spikelets solitary in short spikes; culms 10 to 20 cm. tall..... 9. *E. PACIFICUS*.

Lemmas awned, the awns 3 to 14 mm. long; spikelets usually solitary, rather distant, pale..... 10. *E. SIMPLEX*.

Spikelets densely villous to coarsely, sometimes sparsely, pubescent.

Lemmas awned or awn-tipped; spike 5 to 15 cm. long.

Lemmas copiously villous; awn 1 to 4 mm. long..... 6. *E. INNOVATUS*.

Lemmas hirsute or hirtellous; awn 5 to 10 mm. long..... 7. *E. HIRTIFLORUS*.

Lemmas awnless; spike 10 to 25 cm. long.

Glumes pubescent; lemmas soft, densely villous..... 4. *E. FLAVESCENS*.

Glumes glabrous or nearly so; lemmas relatively firm, coarsely pubescent, sometimes sparsely so..... 5. *E. ARENICOLA*.

Lemmas glabrous to sparsely strigose; culms glabrous; spikes usually compound; blades 15 to 35 mm. wide..... 13. *E. CONDENSATUS*.

Lemmas more or less pubescent; culms harsh-puberulent, at least about the nodes; spikes not or scarcely compound; blades 5 to 15 mm. wide.

14. *E. CINEREUS*.

2b. Rhizomes wanting (or short and stout in *E. condensatus*). Plants tufted.

3a. Rachis tardily disjointing; glumes and lemmas awned.

Spike mostly 5 to 7 mm. wide; spikelets mostly in twos; blades subinvolute.

18. *E. MACOUNII*.

Spike 8 to 10 mm. wide; spikelets often in threes; blades flat, 5 to 10 mm. wide.

19. *E. ARISTATUS*.

3b. Rachis continuous.

4a. Glumes subulate to subsetaceous, not broadened above the base, the nerves obscure except in *E. villosus*.

Lemmas awnless or awn-tipped, the awn shorter than the body.

Spike thick, sometimes compound; spikelets commonly in twos to fours.

Lemmas glabrous to sparsely strigose; culms glabrous; spikes usually compound; blades 15 to 35 mm. wide..... 13. *E. CONDENSATUS*.

Lemmas more or less pubescent; culms harsh-puberulent at least about the nodes; spikes not or scarcely compound; blades 5 to 15 mm. wide.

14. *E. CINEREUS*.

Spike slender; some or most of the spikelets solitary at the nodes, the paired spikelets near the middle.

- Culms numerous in a close tuft, the leaves mostly basal; lemmas mostly awnless..... 12. *E. SALINUS*.
 Culms few, loosely tufted, the leaves scattered along the usually taller culms; lemmas awn-tipped, the awn 2 to 5 mm. long..... 11. *E. AMBIGUUS*.
 Lemmas awned, the awn as long as the body or longer.
 Awns straight; lemmas about 1.2 mm. wide across the back. 20. *E. VILLOSUS*.
 Awns flexuous-divergent; lemmas about 2 mm. wide across the back. 21. *E. INTERRUPTUS*.
 4b. Glumes lanceolate or narrower, broadened above the base, strongly 3- to several-nerved.
 Glumes relatively thin, flat, several-nerved, not indurate at base.
 Lemmas sparsely long-hirsute on the margins toward the summit. 17. *E. HIRSUTUS*.
 Lemmas glabrous or scabrous.
 Lemmas awned..... 15. *E. GLAUCUS*.
 Lemmas awnless or minutely awn-tipped..... 16. *E. VIRESCENS*.
 Glumes firm, indurate at base.
 Awns divergently curved when dry; base of glumes not terete. 22. *E. CANADENSIS*.
 Awns straight; base of glumes terete.
 Glumes about 1 mm. wide about the middle, the bases not bowed out; palea much shorter than the lemma..... 23. *E. RIPARIUS*.
 Glumes 1.5 to 2 mm. wide about the middle, the bases bowed out; palea as long as the lemma..... 24. *E. VIRGINICUS*.



FIGURE 332.—*Elymus caput-medusae*, $\times 1$. (Vasey 3076, Wash.)

1. *Elymus caput-medusae* L. (Fig. 332.) Annual; culms ascending from a decumbent, branching base, slender, 20 to 60 cm. tall; blades narrow, short; spike very bristly, 2 to 5 cm. long (excluding the long spreading awns); glumes subulate, smooth, indurate below, tapering into a slender

awn 1 to 2.5 cm. long; lemmas lanceolate, 3-nerved, 6 mm. long, very scabrous, tapering into a flat awn 5 to 10 cm. long. ☉ —Open ground, Idaho and Washington to California; a bad weed, spreading on the ranges in northern California; introduced from Europe.

2. *Elymus mollis* Trin. AMERICAN DUNEGRASS. (Fig. 333.) Culms stout, pubescent below the spike, glaucous, 60 to 120 cm. tall, with numerous overlapping basal leaves, the rhizomes widely creeping; blades firm, 7 to 12 mm. wide, often involute in drying; spike erect, dense, thick, soft, pale, 7 to 25 cm. long; glumes lanceolate, flat, many-nerved, scabrous or pubescent, 12 to 25 mm. long, acuminate, about as long as the spikelet; lemmas scabrous to felty-pubescent, acuminate or mucronate. ♀ —Sand dunes along the coast, Alaska to Greenland, south to Long Island, N.Y., and central California; along Lakes Superior and Michigan; also eastern Siberia to Japan. Closely related to the European *E. arenarius*



FIGURE 333.—*Elymus mollis*, $\times 1$. (Henderson 2169, Wash.)

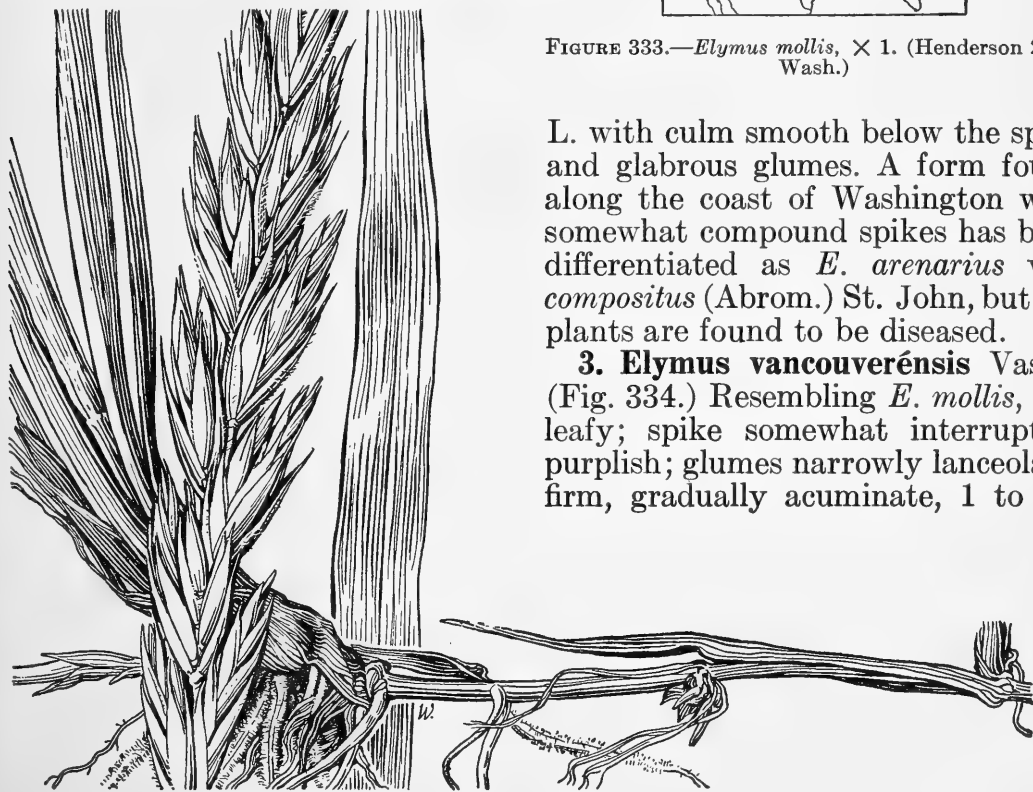


FIGURE 334.—*Elymus vancouverensis*, $\times 1$. (Piper 812, Wash.)

L. with culm smooth below the spike and glabrous glumes. A form found along the coast of Washington with somewhat compound spikes has been differentiated as *E. arenarius* var. *compositus* (Abrom.) St. John, but the plants are found to be diseased.

3. *Elymus vancouverensis* Vasey. (Fig. 334.) Resembling *E. mollis*, less leafy; spike somewhat interrupted, purplish; glumes narrowly lanceolate, firm, gradually acuminate, 1 to 1.5



FIGURE 335.—*Elymus flavescens*, $\times 1$. (Merrill and Wilcox 160, Idaho.)

cm. long, sparsely long-villous, especially toward the apex; lemmas firm, 1 to 1.5 cm. long, tapering into a short awn. 21 —Dunes and sandy shores, British Columbia to northern California.

4. *Elymus flavescens* Scribn. and Smith. (Fig. 335.) Culms erect, slender, glabrous, 50 to 100 cm. tall, the rhizomes slender, nearly vertical from deep slender horizontal rhizomes with brown scales; sheaths glabrous; blades firm, glabrous beneath, scabrous above, 2 to 5 mm. wide, flat, or involute in drying; spike 10 to 25 cm. long, sometimes with short branches, somewhat nodding; spikelets 2 to 3 cm. long, several-flowered, approximate or somewhat distant; glumes very narrow or subulate, pubescent, nerveless, mostly unequal, 1 to 1.5 cm. long; lemmas awnless, densely silky-villous, the hairs long, yellowish or brownish. 21 —Sand dunes, eastern Washington and Oregon, Idaho; South Dakota (Black Hills).

5. *Elymus arenicola* Scribn. and Smith. (Fig. 336.) Resembling *E. flavescens* to which it is closely related; glumes glabrous or nearly so; lemmas firmer, coarsely pubescent,

sometimes sparsely so, or the pubescence confined to the base or margins, the pubescence grayish rather than yellow. 21 —Sandy valleys, often in drifting sand, Washington, Oregon, and Idaho.

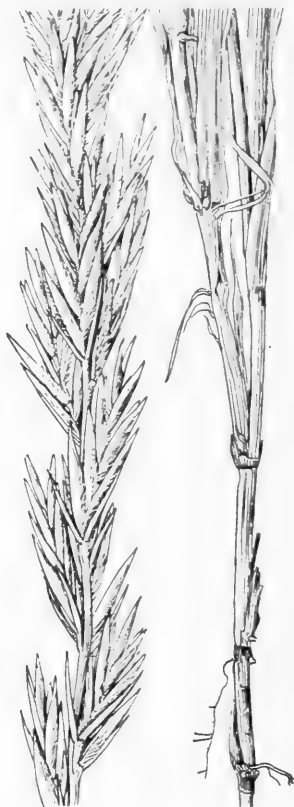


FIGURE 336.—*Elymus arenicola*, $\times 1$. (Palmer 356, Idaho.)



FIGURE 337.—*Elymus innovatus*, $\times 1$. (Hayward 2719, S. Dak.)

6. *Elymus innovatus* Beal. (Fig. 337.) Resembling *E. flavescens*; spike rather dense, 5 to 12 cm. long, the

rachis villous; spikelets 1 to 1.5 cm. long, the narrow glumes and the lemmas densely purplish or grayish-villous, the lemmas with an awn mostly 1 to 4 mm. long. 21 — Open woods and gravelly flats, Alaska to British Columbia; Montana, Wyoming, and South Dakota (Black Hills).

7. ***Elymus hirtiflorus* Hitchc.** (Fig. 338.) Culms erect, tufted, 40 to 90 cm. tall, with slender creeping rhizomes; blades firm, flat or usually involute, glabrous beneath, 5 to 20 cm. long, 1 to 4 mm. wide when flat; spike erect, 5 to 15 cm. long; spikelets 4- to 6-flowered; glumes firm, hirsute, narrow, tapering into an awn about as long as the body, the entire length 1 to 1.5 cm.; lemmas hirsute, sometimes sparingly so, the lower 8 to 9 mm. long, with an awn 5 to 10 mm. long. 21 — River banks, Wyoming; Alberta.

8. ***Elymus triticoides* Buckl.** BEARDLESS WILD-RYE. (Fig. 339.) Culms usually glaucous, rarely pubescent below spike, 60 to 120 cm. tall, commonly in large colonies from extensively creeping scaly rhizomes; ligule a truncate rim about 1 mm.



FIGURE 338.—*Elymus hirtiflorus*. Spike, $\times 1$; spikelet, $\times 5$. (Type.)

long; blades mostly 2 to 6 mm. wide, flat or soon involute; spike erect, slender to rather dense, rarely compound; spikelets mostly 12 to 20 mm. long; glumes very narrow to subulate, firm, nerveless or 1- to 3-nerved, awn-

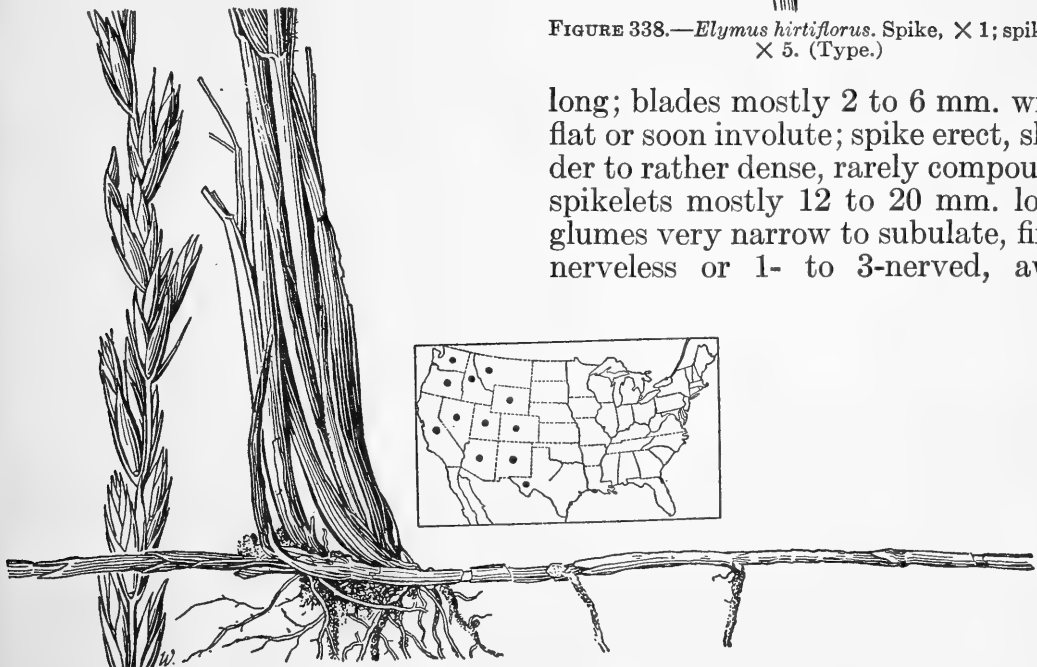


FIGURE 339.—*Elymus triticoides*, $\times 1$. (Cusick 763, Oreg.)



FIGURE 340.—*Elymus pacificus*, $\times 1$. (Davy 6781, Calif.)

tipped, 5 to 15 mm. long, those of the upper spikelets usually reduced or obsolete; lemmas 6 to 10 mm. long, glabrous, firm, brownish, purplish or tawny, awn-tipped. 21 —Moist or alkaline soil, at low and medium elevations, Montana to Washington, south to western Texas and Baja California. *ELYMUS TRITICOIDES* var.

PUBÉSCENS Hitchc. Sheaths and involute blades pubescent. 21 —Oregon, California, Nevada; rare.

ELYMUS TRITICOIDES subsp. *MULTIFLÓRUS* Gould. Plants robust; blades 6 to 12 mm. wide; spike compound, the branches mostly short, congested, but sometimes to 5 cm. long; spikelets 1.5 to 2.5 cm. long. 21 —Wyoming to Washington, Nevada, and California. Intergrades with the species.

9. *Elymus pacificus* Gould. (Fig. 340.) Culms low, more or less spreading, 10 to 20 cm. tall, with slender extensively creeping rhizomes; blades involute, mostly longer than the culms, pungent-pointed; spike 2 to 5 cm. long, the rachis glabrous; spikelets solitary, few-flowered, 12 to 15 mm. long; glumes nerveless, firm, tapering into a short awn; lemmas about 1 cm. long, obscurely nerved, pointed or awn-tipped, the margin very narrowly hyaline. (*Agropyron arenicola* Davy, not *Elymus arenicola* Scribn. and Smith.) 21 —Sandy seacoast, middle California.

10. *Elymus simplex* Scribn. and Williams. (Fig. 341.) More extensively creeping than *E. triticoides*, the rhizomes sometimes as much as 5 m. long; culms ascending, 50 to 90 cm. tall; sheaths crowded, the lower often becoming reddish and papery; blades firm, flat or loosely rolled, strongly nerved; spikes 5 to 20 cm. long; spikelets as much as 2.5 cm. long, usually distant, solitary or sometimes paired; glumes subulate-aristate, 1 to 2 cm. long; rachilla villous; lemmas glabrous, the margins hyaline, awned, the awn 3 to 14 mm. long. 21 —River banks, alkaline flats, drifting sands, and rocky slopes, southern Wyoming, Colorado, and Utah. Valuable in erosion control.

11. *Elymus ambiguus* Vasey and Scribn. (Fig. 342.) Culms few, loosely tufted, erect, 30 to 70 cm. tall; sheaths glabrous; blades flat to subinvolute, 2 to 5 mm. wide, scabrous; spike erect, rather dense, 5 to 15 cm. long; spikelets solitary toward the base and

apex of the spike, mostly 2- to 4-flowered; glumes subulate, scabrous toward the awned tip; lemmas glabrous or scabrous on the back, about 1 cm. long, short-awned, the awn 2 to 5 mm. long. ♀ —Open slopes at medium altitudes in the mountains, Montana, Colorado, and Utah. *ELYMUS AMBIGUUS* var. *STRIGOSUS* (Rydb.) Hitchc. Lemmas strigose or pubescent. ♀ (*E. strigosus* Rydb., lemmas strigose; *E. villiflorus* Rydb.) lemmas pubescent.)—Wyoming, Colorado.

12. *Elymus salinus* Jones. SALINA WILD-RYE. (Fig. 343.) Culms erect, 30 to 80 cm. tall, sometimes scabrous below nodes and below spike; sheaths scabrous; blades firm, involute, scabrous, or rarely softly pubescent; spike slender, erect, 5 to 12 cm. long; spikelets mostly solitary, often rather distant, 1 to 1.5 cm. long; glumes subulate, 4 to 8 mm. long, sometimes reduced, glabrous or scabrous; lemmas about 1 cm. long, awnless or rarely awn-tipped, glabrous or scabrous, rarely sparsely strigose, the nerves obscure. ♀ —Rocky slopes and sagebrush hills, Wyoming and Colorado to Idaho, Nevada, and southern California.

13. *Elymus condensatus* Presl. GIANT WILD-RYE. (Fig. 344.) Culms robust, in large tufts, usually 2 to 3 m. tall, with short thick rhizomes; ligule 2 to 5 mm. long; blades firm, strongly nerved, flat, as much as 3 cm. wide; spike erect, dense, 15 to 50 cm. long, usually more or less compound, the branches erect, 2 to 7 cm. long; spikelets often in threes to fives, commonly distorted by pressure; glumes subulate, awn-pointed, usually 1-nerved or nerveless, about as long as the first lemma, sometimes longer; lemmas glabrous to sparsely strigose, with a hyaline margin, awnless or mucronate. ♀ —Sand dunes, sandy or rocky slopes, moist ravines, mostly near the coast, Alameda County to San Diego County, Calif., and on the adjacent islands off the coast.



FIGURE 341.—*Elymus simplex*, $\times 1$. (Type.)



FIGURE 342.—*Elymus ambiguus*, $\times 1$. (Hitchcock 10990, Colo.)



FIGURE 343.—*Elymus salinus*, $\times 1$. (Rydberg 2041, Wyo.)

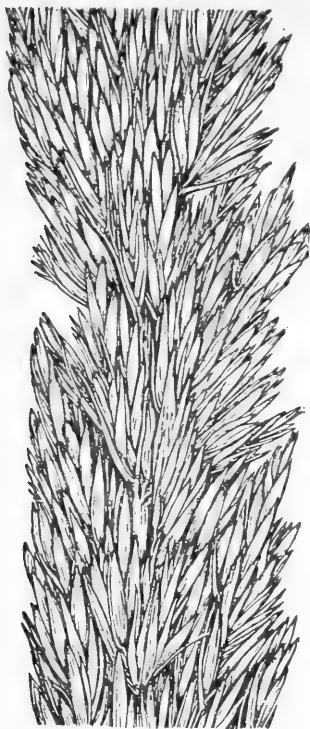


FIGURE 344.—*Elymus condensatus*, $\times 1$. (Pringle in 1882, Calif.)

14. *Elymus cinereus* Scribn. and Merr. (Fig. 345.) Culms robust, but less so than in *E. condensatus*, typically without rhizomes, harsh-puberulent, at least about the nodes; sheaths and blades glabrous to densely harsh-



FIGURE 345.—*Elymus cinereus*, $\times 1$. (Butler 839, Calif.)

puberulent, the blades mostly less than 15 mm. wide; spikes 10 to 25 cm. long (mostly 12 to 20 cm.), thick and dense but typically not branched, or with 1 of the 3 to 5 spikelets at a node pedicellate; glumes and lemmas like those of *E. condensatus*, but the lemmas more or less pubescent. σ (*E. condensatus* var. *pubens* Piper.)—River banks, ravines, moist or dry slopes and plains, mostly at higher altitudes than the preceding, Minnesota to British Columbia, south to Colorado, and California. On the whole this appears to be distinct from *E. condensatus*, but a rather large number of specimens from Wyoming to California have branched spikes,

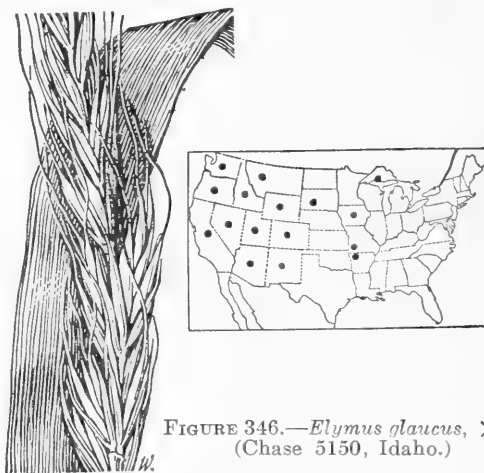


FIGURE 346.—*Elymus glaucus*, $\times 1$. (Chase 5150, Idaho.)

some with blades to 15 mm. wide, a few with rhizomes. These intermediate specimens are more or less harshly puberulent, at least about the nodes. The seeds are sometimes used for food by the Indians.

15. *Elymus glaucus* Buckl. BLUE WILD-RYE. (Fig. 346.) Culms in loose to dense tufts, often bent at base, erect, 60 to 120 cm. tall, without rhizomes, leafy; sheaths smooth or scabrous; blades flat, usually lax, mostly 8 to 15 mm. wide, usually scabrous on both surfaces, sometimes narrow and subinvolute; spike long-exserted, from erect to somewhat nodding, usually dense, commonly 5 to 20 cm. long, occasionally longer; glumes lanceolate at base, 8 to 15 mm. long, with 2 to 5 strong scabrous nerves, acuminate or

awn-pointed; lemmas awned, the awn 1 to 2 times as long as the body, erect to spreading. ♀ —Open woods, copses, and dry hills at low and medium altitudes, Ontario and Michigan to southern Alaska, south through South Dakota and Colorado to New Mexico and California; Iowa, Missouri, and Arkansas. Exceedingly variable, the commonest form is loosely tufted, with lax blades 10 to 15 mm. wide and somewhat nodding spike, but plants with narrower blades and stiff spikes are frequent, the extreme form differentiated as *E. angustifolius* Davy. The original specimen described by Buckley is a rather small plant intermediate in blades and spike. *ELYMUS GLAUCUS* var. *JEPSÓNI* Davy. Sheaths and blades pubescent. ♀ —British Columbia to California; Montana and Nevada.



FIGURE 347.—*Elymus virescens*, × 1. (Flett, Wash.)

16. *Elymus viréscens* Piper. (Fig. 347.) Resembling *E. glaucus* and nearly as variable in habit, often decumbent at base; sheaths from glabrous to retrorsely pubescent, blades 2 to 12 mm. wide, glabrous to harsh-puberulent; spike 5 to 15 cm. long, dense, spikelets imbricate; glumes flat, 1 to 2 mm. wide, strongly nerved, pointed or awn-tipped; lemmas glabrous to scabrous, barely awn-tipped or with an awn 1 to 4 mm. long. ♀ Moist woods, southern Alaska to California.

17. *Elymus hirsútus* Presl. (Fig. 348.) Culms solitary or in small tufts,



FIGURE 348.—*Elymus hirsutus*, × 5. (Thompson 7332, Wash.)

50 to 140 cm. tall, rather weak; blades flat, lax, 4 to 10 mm. wide, scabrous; spike drooping, mostly loose, the rachis exposed; spikelets mostly about 15 mm. long; glumes about 1 mm. wide, strongly nerved, awned; lemmas sparsely long-hirsute along the margin toward the summit, sometimes coarsely pubescent on the back, the slender awn flexuous or divergent, 1.5 to 2 cm. long. ♀ —Moist woods or open ground, Alaska to Oregon.

18. *Elymus macóunii* Vasey. *MACOUN WILD-RYE.* (Fig. 349.) Culms

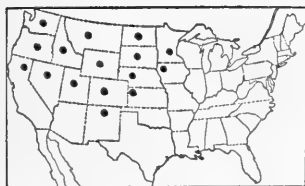


FIGURE 349.—*Elymus macounii*. Disarticulating spike, $\times 1$. (Anderson, Mont.)

densely tufted, erect, slender, 50 to 100 cm. tall; sheaths glabrous or rarely pubescent; blades erect, rather firm, subinvolute, usually scabrous on both surfaces, 10 to 20 cm. long, mostly 2 to 5 mm. wide; spike slender, erect or somewhat nodding, 4 to 12 cm. long, usually about 5 mm. thick (excluding awns), the slender rachis tardily disarticulating; spikelets imbricate, appressed, mostly 2-flowered, about 1 cm. long, excluding the awns; glumes very narrow, scabrous, slightly divergent but not bowed out at base, the midnerve usually distinct; lemmas scabrous toward the apex, extending into slender straight awns 1 to 2 cm. long. σ —Meadows and open ground, Minnesota to Alaska and eastern Washington, south to Iowa, Kansas, New Mexico, and California. (Said by Stebbins to be a hybrid between *Agropyron trachycaulum* and species of *Hordeum*.)

19. *Elymus aristatus* Merr. (Fig. 350.) Culms tufted, rather leafy, erect, 70 to 100 cm. tall; sheaths glabrous, blades flat, 5 to 10 mm. wide; spike erect, dense, 6 to 14 cm. long, 5 to 10 mm. thick, the rachis tardily disarticulating; spikelets closely imbricate, often in threes, 1- to 2-flowered, about 1 cm. long, excluding the awns; glumes subsetaceous, scabrous, 10 to 20 mm. long; lemmas slightly wider than in *E. macounii*, sparsely scabrous at least on the upper half, the slender straight awn 10 to 20 mm. long. σ —Meadows and open slopes, at middle altitudes, Wyoming to Washington, south to Nevada and California.



FIGURE 350.—*Elymus aristatus*, $\times 1$. (Chase 4762, Idaho.)

20. *Elymus villósus* Muhl. (Fig. 351.) Culms in small tufts, ascending, slender, 60 to 100 cm. tall; sheaths glabrous to pilose; blades flat, lax, pubescent on upper surface, glabrous and glossy to scabrous beneath; spike drooping, dense, 5 to 12 cm. long; glumes subsetaceous, spreading, distinctly nerved above the firm cylindric nerveless divergent or somewhat bowed-out base, hirsute, 12 to 20 mm. long; lemmas nerved toward the tip, hispidulous to hirsute, 7 to 9 mm. long, about 1.2 mm. across the back, the straight slender awn 1 to 3 cm. long. σ (*E. striatus*, American authors, not Willd.) Moist or dry woods and shaded slopes, Canada and Vermont to North Da-

kota and Wyoming, south to South Carolina, Alabama, and Texas. *E. ARKANSANUS* Scribn. and Ball (*E. villosus* forma *arkansanus* Fernald), a relatively rare form with usually slightly stouter culms, the spikes mostly less drooping, scabrous glumes, and glabrous to scabrous lemmas, is found sparingly in Illinois, North

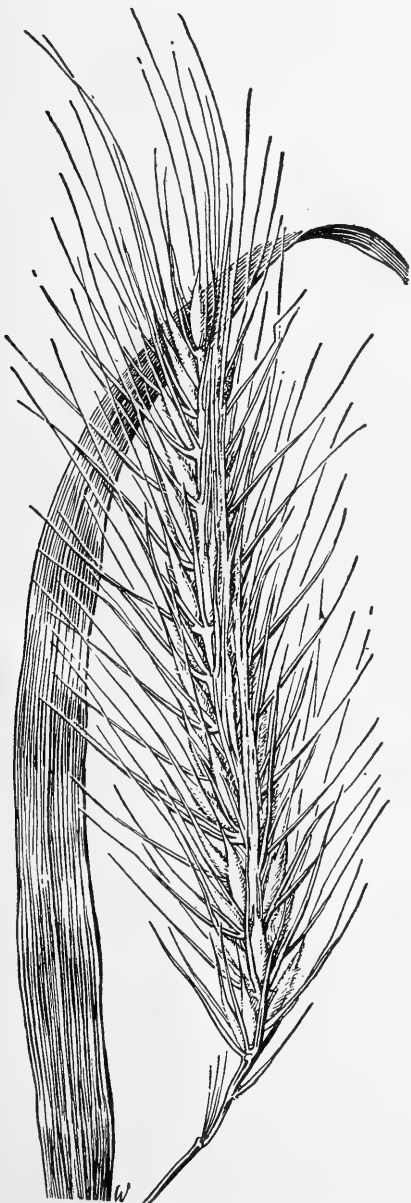
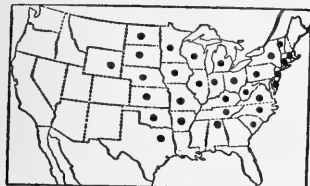


FIGURE 351.—*Elymus villosus*, $\times 1$. (Commons 163, Del.)



FIGURE 352.—*Elymus interruptus*, $\times 1$. (Grant 3071, Minn.)

Dakota, South Dakota, Nebraska, Missouri, Maryland, Virginia, North Carolina, Kentucky, Tennessee, Arkansas, Texas, and Wyoming. Large specimens resemble *E. riparius*, but the palea reaches the base of the awn.

21. *Elymus interruptus* Buckl. (Fig. 352.) Culms erect, 70 to 130 cm. tall; sheaths glabrous; blades flat scabrous, 5 to 12 mm. wide; spike flexuous or nodding, 8 to 20 cm. long; glumes setaceous or nearly so, 1 to 3 cm. long, one or both reduced in occasional spikelets, mostly flexuous or spreading, the nerves obscure at least toward the base; lemmas hirsute to scabrous, or glabrous, about 1 cm. long, about 2 mm. across the back, the awn flexuous or divergent, 1 to 3 cm. long. 2 (*E. diversiglumis* Scribn. and Ball.)—



FIGURE 353.—*Elymus canadensis*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Lansing 3240, Mich.)

Rich, open moist soil, Michigan to North Dakota and Wyoming; Tennessee, Arkansas, Oklahoma, Texas, New Mexico.

22. *Elymus canadensis* L. CANADA WILD-RYE. (Fig. 353.) Green or often glaucous; culms erect, tufted, mostly 1 to 1.5 m. tall; sheaths glabrous or rarely pubescent; blades flat, scabrous or sparsely hispid on the upper surface, mostly 1 to 2 cm. wide; spike thick and bristly, nodding or drooping, often interrupted below, 10 to 25 cm. long, sometimes glaucous; spikelets commonly in threes or fours, slightly spreading; glumes narrow, mostly 2- to 4-nerved, scabrous, sometimes hispid but less so than the lemmas, the bases somewhat indurate and divergent but scarcely bowed out, the awn about as long as the body; lemmas scabrous-hirsute to hirsute-pubescent, rarely glabrous, strongly nerved above, the awn divergently curved when dry, 2 to 3 cm. long. ♀ —River banks, open ground, and sandy soil, Quebec to southern Alaska, south to North Carolina, Missouri, Texas, Arizona, and northern California. *E. wiegandii* Fernald has been differentiated on lax inflorescence, shorter glumes, and thin flat blades, pilose on the nerves. These characters are found to be rarely coordinated, loose flexuous spikes being not infrequent in humid regions, rarer in dry areas; pilose blades are very rare. *ELYMUS CANADENSIS* var. *ROBUSTUS* (Scribn. and Smith) Mackenz. and Bush. Differing in the stouter and denser only slightly nodding very bristly spikes. ♀ —Prairies, Massachusetts to Montana, south to Kentucky, Missouri, Texas, and Arizona. *ELYMUS CANADENSIS* var. *BRACHYSTACHYS* (Scribn. and Ball) Farwell. Lemmas glabrous or nearly so. ♀ —Moist open or partly shaded ground, Arkansas, Oklahoma, Texas, and New Mexico; Mexico. Grades into *E. canadensis*; many specimens of *E. canadensis* from Kansas to North Dakota have sparingly hirsute lem-

mas, showing a transition to this variety.

23. *Elymus riparius* Wiegand. (Fig. 354.) Culms rather slender, erect, 1 to 1.5 m. tall; sheaths glabrous; blades rather thin, flat, 5 to 15 mm. wide, scabrous; spike somewhat nodding, 7 to 20 cm. long; glumes narrow, about 1 mm. wide at the middle, 2- to 4-nerved, somewhat indurate but scarcely bowed out at base; lemmas minutely hispidulous to glabrous, the awn straight, mostly 2 to 3 cm. long. ♀ —River banks



FIGURE 354.—*Elymus riparius*, $\times 1$. (Woodward, Conn.)

and low ground, Quebec and Maine to Wisconsin and Nebraska, south to North Carolina, Arkansas, and Kansas. Differing from *E. virginicus* var. *glabriflorus* in the nodding spike and less indurate glumes; from *E. canadensis* in the straight awns and narrower and somewhat more indurate glumes. When the ranges of *E. riparius* and *E. canadensis* coincide the latter may be distinguished by the hirsute lemmas.

24. *Elymus virginicus* L. VIRGINIA WILD-RYE. (Fig. 355.) Culms tufted, erect, 60 to 120 cm. tall; sheaths glabrous; blades flat, scabrous, mostly 5 to 15 mm. wide; spike usually erect, often partly included, 5 to 15 cm. long; glumes strongly nerved, firm, indurate, yellowish, nerveless and bowed out at base leaving a rounded sinus, broadened above (1.5 to 2 mm. wide), scabrous, the apex some-

what curved, tapering into a straight awn, about as long as the body or shorter; lemmas glabrous and nerveless below, scabrous and nerved above, tapering into a straight awn usually about 1 cm. long. ♀ —



FIGURE 355.—*Elymus virginicus*, $\times 1$. (Hitchcock 79, Va.)

Moist ground, low woods, and along streams, Newfoundland to Alberta, south to Florida and Arizona. Sometimes called Terrell grass. A variable species of which the following intergrading varieties may be distinguished.

ELYMUS VIRGINICUS var. *GLABRIFLORUS* (Vasey) Bush. Glumes mostly less bowed out; lemmas glabrous; awns mostly 2 to 3 cm. long, the spike more bristly. ♀ —Maine to Kansas, south to Florida and New Mexico.

ELYMUS VIRGINICUS var. *HALOPHILUS* (Bickn.) Wiegand. More slen-

der, usually glaucous; blades narrower, often becoming involute; spikes and spikelets somewhat smaller.

♀ —Brackish marshes and moist sand along the coast, Maine to Virginia.

ELYMUS VIRGINICUS var. *SUBMUTICUS* Hook. Glumes and lemmas awnless or nearly so. ♀ —Woods and open ground, Quebec to Washington, south to Rhode Island; Ohio and Kentucky to Oklahoma and Montana; Utah.

ELYMUS VIRGINICUS var. *INTERMEDIUS* (Vasey) Bush. Glumes, lemmas, and rachis more or less hirsute, the awns about as in *E. virginicus*. ♀ (*E. hirsutiglumis* Scribn.) —Thickets and low ground, Maine to Iowa, south to Florida and Texas.

ELYMUS VIRGINICUS var. *AUSTRÁLIS* (Scribn. and Ball) Hitchc. Differing from *E. virginicus* var. *intermedius* in the stouter, bristly spike and longer awns; differing from *E. virginicus* var. *glabriflorus* in the hirsute or strongly scabrous glumes and lemmas. ♀ —Prairies, rocky hills, and open woods, Vermont to Iowa, south to Florida, Kentucky, and Texas.

ELYMUS GIGANTÉUS Vahl. Robust perennial from stout rhizomes; blades numerous at base, elongate; spike dense, 15 to 20 cm. long, about 2 cm. thick; glumes and lemmas sharp-pointed, the glumes glabrous, the lemmas pubescent below. ♀ —Occasionally cultivated for ornament. Siberia.

47. SITÁNION Raf. SQUIRRELTAIL

Spikelets 2- to few-flowered, the uppermost floret reduced, usually 2 at each node of a disarticulating rachis, the rachis breaking at the base of each joint, remaining attached as a pointed stipe to the spikelets above; glumes narrow or setaceous, 1- to 3-nerved, the nerves prominent, extending into one to several awns, these (when more than one) irregular in size, sometimes mere lateral appendages of the long central awn, sometimes equal, the glume being bifid; lemmas firm, convex on the back, nearly terete, 5-nerved, the nerves obscure, the apex slightly 2-toothed, the central nerve extending into a long, slender, finally spreading awn, sometimes one or more of the lateral nerves also extending into short awns; palea firm, nearly as long as the body of the lemma, the two keels serrulate. Low or rather tall tufted perennials, with bristly spikes. Type species, *Sitanion elymoides* Raf. (*S. hystrix*). Name from Greek *sitos*, grain.

The species are exceedingly variable, being glabrous to densely pubescent and green to glaucous; the glumes and lemmas vary in division and length of awns. Some 15 to 25 variations have been recognized as species, but study of

extensive collections shows that most of the characters used in differentiating the forms are inconstant and combine in various ways.

The species are widespread in the Western States but do not form complete stands. They have forage value when young but at maturity the disarticulating joints of the spike, with their pointed rachis joints and long-awned spikelets, are blown about by the wind and often cause injury to stock, penetrating the mouth, nose, and ears, working in by means of the forwardly roughened awns, and causing inflammation. Grazed also after the heads are blown off. The commonest species is *S. hystrix*.

Spike much longer than broad; glumes narrowly lanceolate, 2- to 4-nerved.

1. *S. HANSENI*.

Spike as broad as long or broader; glumes bristlelike, 1- or obscurely 2-nerved.

Glumes cleft into at least 3 fine divisions.....2. *S. JUBATUM*.

Glumes entire or 2-cleft.....3. *S. HYSTRIX*.

1. *Sitanion hanseni* (Scribn.) J. G. Smith. HANSEN SQUIRRELTAIL. (Fig. 356.) Culms 60 to 100 cm. tall; sheaths and blades glabrous or scabrous to softly pubescent, the blades flat to subinvolute, 2 to 8 mm. wide; spike somewhat nodding or flexuous, 8 to 20 cm. long; glumes narrowly lanceolate, sometimes bifid, 2- to 3-nerved, long-awned, lower lemmas about 8 mm. long, the awn 4 to 5 cm. long, divergent when dry and mature. 2 —Open woods and rocky slopes, Wyoming to eastern Washington, Utah, and California. Pubescent plants have been differentiated as *S. anomalum* J. G. Smith. (*S. hanseni* is said by Stebbins to consist of a series of hybrids between *Elymus glaucus* and *Sitanion jubatum* or *S. hystrix*.)

2. *Sitanion jubatum* J. G. Smith. BIG SQUIRRELTAIL. (Fig. 357.) Culms erect to ascending, 20 to 60 cm. tall, rarely taller; foliage glabrous or scabrous to white-villous, the blades flat, often becoming involute, mostly not more than 4 mm. wide; spike erect, dense, 3 to 10 cm. long, thick and bushy from the numerous long slender spreading awns; glumes split into 3 or more long awns; lemmas mostly 8 to 10 mm. long, smooth, or scabrous toward apex, the awns and those of the glumes spreading, 3 to 10 cm. long, rarely shorter. 2 —Rocky or brushy hillsides and open dry woods and plains, Idaho to eastern Washington, south to Utah, Nevada, Arizona, and Baja California. Occasion-

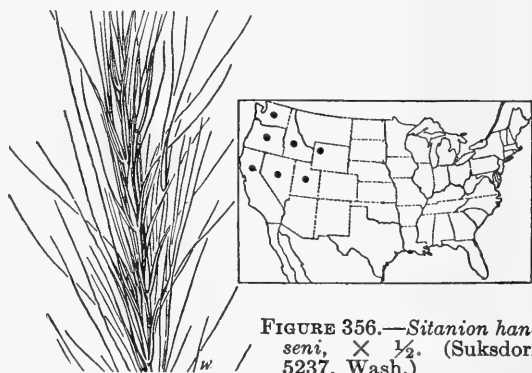


FIGURE 356.—*Sitanion hanseni*, $\times \frac{1}{2}$. (Suksdorf 5237, Wash.)

ally a few of the glumes in a spike are divided into only 2 awns. Short-awned plants have been differentiated as *S. breviaristatum* J. G. Smith and the more densely pubescent plants as *S. villosum* J. G. Smith.

3. *Sitanion hystrix* (Nutt.) J. G. Smith. SQUIRRELTAIL. (Fig. 358.) Culms erect to spreading, rather stiff, 10 to 50 cm. tall; foliage from glabrous or puberulent to softly and densely white-pubescent, the blades flat to involute, rather stiffly ascending to spreading, 5 to 20 cm. long, 1 to 3 mm. wide, rarely as much as 5 mm. wide; spike mostly short-exserted or partly included, erect, 2 to 7 cm., rarely 10 cm., long or longer, the glumes very narrow, 1- to 2-nerved, the nerves extending into scabrous awns, sometimes bifid to the middle, or bearing a bristle or awn along one margin; lemmas convex, smooth or scabrous to appressed pubescent, sometimes glaucous, the awns of glumes and lemmas widely spreading, 2 to 10 cm. long. 2 —Dry hills,

plains, open woods, and rocky slopes, South Dakota to British Columbia, south to Missouri, Texas, California, and Mexico. At high altitudes plants often dwarf. Softly pubescent plants have been differentiated as *S. cinereum* J. G. Smith (the pubescence whitish) and *S. velutinum* Piper;

short-awned plants as *S. insulare* J. G. Smith and *S. marginatum* Scribn. and Merr.; rather small plants with unusually slender awns as *S. minus* J. G. Smith, and tall plants with coarse spikes as *S. brevifolium* J. G. Smith, *S. longifolium* J. G. Smith, and *S. montanum* J. G. Smith.

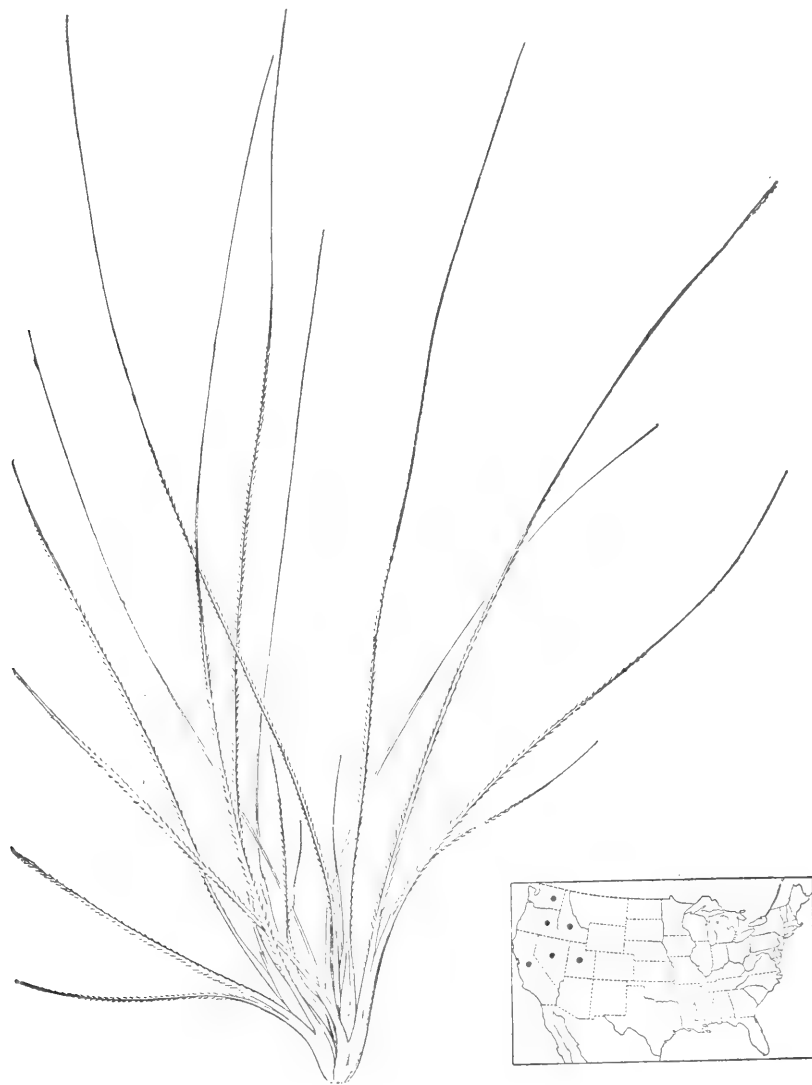


FIGURE 357.—*Sitanion jubatum*. Pair of spikelets, $\times 2$. (Type.)

48. HÝSTRIX Moench

Spikelets 2- to 4-flowered, 1 to 4 at each node of a continuous flattened rachis, horizontally spreading or ascending at maturity; glumes reduced to short or minute awns, the first usually obsolete, both often wanting in the upper spikelets; lemmas convex, rigid, tapering into long awns, 5-nerved, the nerves obscure except toward the tip; palea about as long as the body of the lemma. Erect perennials, with flat blades and bristly, loosely flowered spikes. Type species, *Elymus hystrix* L. (*Hystrix patula*). *Hustrix*, Greek name for the porcupine, alluding to the bristly spikes. The species have little forage value, as



FIGURE 358.—*Sitanion hystrix*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 3$. (Hitchcock 2289, Colo.)

they are nowhere abundant. The first species is worthy of cultivation for ornament.

- Spikelets soon divergent; lemmas glabrous or pubescent, not hispid..... 1. *H. PATULA*.
 Spikelets ascending or appressed; lemmas appressed-hispid..... 2. *H. CALIFORNICA*.



FIGURE 359.—*Hystrix patula*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 3$. (Moyer, Minn.)

1. *Hystrix patula* Moench. BOTTLBRUSH. (Fig. 359.) Culms slender, 60 to 120 cm. tall; sheaths glabrous or scabrous, rarely retrorsely pubescent; blades mostly 7 to 15 mm. wide; spike

nodding, 8 to 15 cm. long, the internodes of the slender rachis 5 to 10 mm. long; spikelets mostly in pairs, 1 to 1.5 cm. long, horizontally spreading toward maturity; lemmas glabrous or

sometimes coarsely pubescent, the awns 1 to 4 cm. long, slender, straight. ♀ (*H. hystrix* Millsp.)—Moist or rocky woods, Nova Scotia to North Dakota, south to Georgia and Arkansas. Plants with pubescent lemmas have been differentiated as *H. patula* var. *bigeloviana* (Fernald) Deam. Such plants occur throughout the range, except from Delaware, Maryland, and southward.

2. *Hystrix californica* (Boland.) Kuntze. (Fig. 360.) Culms stout, 1 to 2 m. tall; sheaths hispid or the upper smooth; blades as much as 2 cm. wide; spike 12 to 25 cm. long; spikelets usually 3 or 4 at a node, 1.2 to 1.5 cm. long, thicker than in *H. patula*, ascending at maturity; lemmas hispidulous, the awn about 2 cm. long. ♀ —Woods and shaded

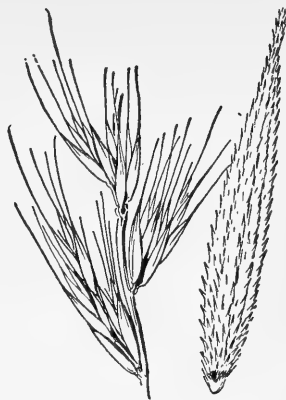


FIGURE 360.—*Hystrix californica*. Spike, $\times \frac{1}{2}$; floret, $\times 3$. (Vasey, Calif.)

banks, near the coast, Sonoma County to Santa Cruz County, Calif. In addition to the sessile spikelets there may be a short branch bearing 1 or 2 spikelets.

49. *HÓRDEUM* L. BARLEY

Spikelets 1-flowered (rarely 2-flowered), 3 (sometimes 2) together at each node of the articulate rachis (continuous in *Hordeum vulgare*), the back of the lemma turned from the rachis, the middle spikelet sessile, the lateral ones pediceled (except in *H. vulgare* and *H. montanense*); rachilla disarticulating above the glumes and, in the central spikelet, prolonged behind the palea as a bristle and sometimes bearing a rudimentary floret; lateral spikelets usually imperfect, sometimes reduced to bristles; glumes narrow, often subulate and awned, standing in front of the spikelet; lemmas rounded on the back, 5-nerved, usually obscurely so, tapering into a usually long awn. Annual or perennial low or rather tall grasses, with flat blades and dense bristly spikes, disarticulating at the base of the rachis segment, this remaining as a stipe below the attached triad of spikelets. Type species, *Hordeum vulgare*. *Hordeum*, the old Latin name for barley.

Aside from the well-known cultivated barley, *H. vulgare*, the species are of relatively minor value. All furnish forage when young, but many species are aggressive weeds and some (especially *H. jubatum*) at maturity are injurious to stock because of the sharp-pointed joints of the mature spikes, which pierce the nose and mouth parts. The auricle at the base of the blades, characteristic of *Hordeae*, is wanting in some species of this genus.

Plants perennial; awns slender; auricle wanting.

Lateral spikelets sessile; central spikelet usually 2-flowered..... 1. *H. MONTANENSE*.

Lateral spikelets pedicellate.

Spike, including awns, as broad as long or nearly so (narrower in var. *caespitosum*); awns 2 to 5 cm. long..... 2. *H. JUBATUM*.

Spike, including awns, much longer than broad, awns not more than 1 cm. long.

Floret of lateral spikelet evident, from staminate to reduced and empty; spike 6 to 10 mm. wide; blades 3 to 8 mm. wide..... 3. *H. BRACHYANTHERUM*.

Floret of lateral spikelets scarcely distinct from its awn; spike about 5 mm. wide; blades 2 to 3 mm. wide..... 4. *H. CALIFORNICUM*.

Plants annual, branching at base; awns mostly stouter.

Blades with prominent auricles at base.

Rachis continuous, the 3 spikelets sessile..... 11. *H. VULGARE*.

- Rachis disarticulating; lateral spikelets pedicellate.
 Floret of lateral spikelets longer and broader than that of central spikelet; rachis internodes mostly 3 mm. long..... 9. *H. LEPORINUM*.
 Floret of lateral spikelets not larger than that of central spikelet; rachis internodes mostly 2 mm. long..... 10. *H. STEBBINSII*.
 Blades without auricles.
 Glumes of the fertile spikelet dilated above the base..... 5. *H. PUSILLUM*.
 Glumes of the fertile spikelet not dilated.
 Awns slender, 1.5 to 2 cm. long, fragile; one glume of lateral spikelets slightly dilated. 6. *H. ARIZONICUM*.
 Awns relatively stout.
 Floret of lateral spikelets awnless; glumes slender, not rigid, not bowed out. 7. *H. DEPRESSUM*.
 Floret of lateral spikelets awned; glumes thickened and slightly bowed out below, rigid..... 8. *H. HYSTRIX*.

1. *Hordeum montanense* Scribn. (Fig. 361.) Culms 60 to 100 cm. tall; sheaths glabrous; blades flat, lax, scabrous, 5 to 8 mm. wide; spike nodding, 8 to 17 cm. long; central spikelets usually 2-flowered, with a rudiment of a third floret; lateral spikelets sessile, usually well developed; glumes slightly broadened above the base, 1 to 3.5 cm. long including awns; lower floret of central spikelet about 8 mm. long, the awn 1.5 to 3.5 cm. long. ♀ (*H. pammeli* Scribn. and Ball.)—Prairies, Illinois, Iowa, South Dakota, Montana, and Wyoming. Variable and somewhat anomalous; lateral spikelets sometimes with 2 florets. Approaches *Elymus*; specimens referred by geneticists to hybrid *Hordeum jubatum* × *Elymus virginicus*.

2. *Hordeum jubatum* L. FOXTAIL BARLEY. (Fig. 362.) Perennial, tufted; culms erect, or decumbent at base, 30 to 60 cm. tall; blades 2 to 5 mm. wide, scabrous; spike nodding, 5 to 10 cm. long, about as wide, soft, pale; lateral spikelets reduced to 1 to 3 spreading awns; glumes of perfect spikelet awn-like, 2.5 to 6 cm. long, spreading; lemma 6 to 8 mm. long with an awn as long as the glumes. ♀ —Open ground, meadows and waste places, Newfoundland and Labrador to Alaska, south to Maryland, Missouri, Texas, California, and Mexico; introduced in the Eastern States. A troublesome weed in the Western States, especially in irrigated meadows. *HORDEUM JUBATUM* var. *CAESPITOSUM* (Scribn.) Hitchc. *BOBTAIL BARLEY*. Awns 1.5 to 3 cm. long. (*H. caespit-*

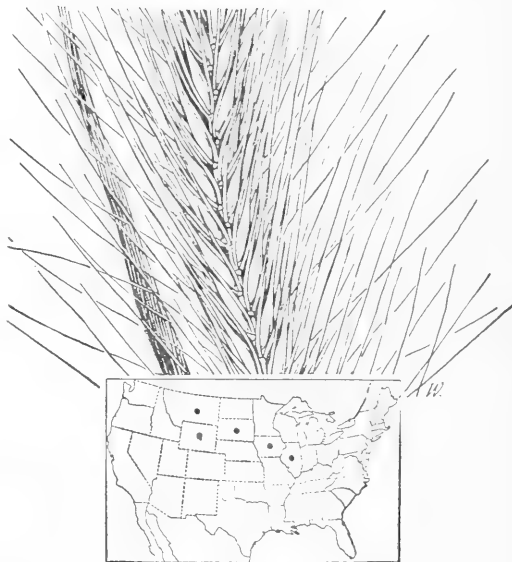


FIGURE 361.—*Hordeum montanense*, × 1. (V. H. Chase 1467, Ill.)

tosum Scribn.) North Dakota to Alaska, south to California and Arizona; Mexico.

3. *Hordeum brachyantherum* Nevski. MEADOW BARLEY. (Fig. 363.) Perennial, tufted; culms erect or ascending, 20 to 70 cm., sometimes to 100 cm., tall; lower sheaths thin, often shredded, softly retrorse-pubescent to glabrous; blades 3 to 8 mm., mostly 3 to 6 mm., wide, spike erect or slightly nodding, 8 to 10 cm. long, rarely longer, sometimes purplish; floret of central spikelet usually 7 to 10 mm. long, typically 1.5 mm. wide, the awn about 1 cm. long, the glumes slightly shorter; glumes of lateral spikelets usually unequal, somewhat shorter, the floret from well developed and staminate to much reduced and empty (occasionally a staminate and

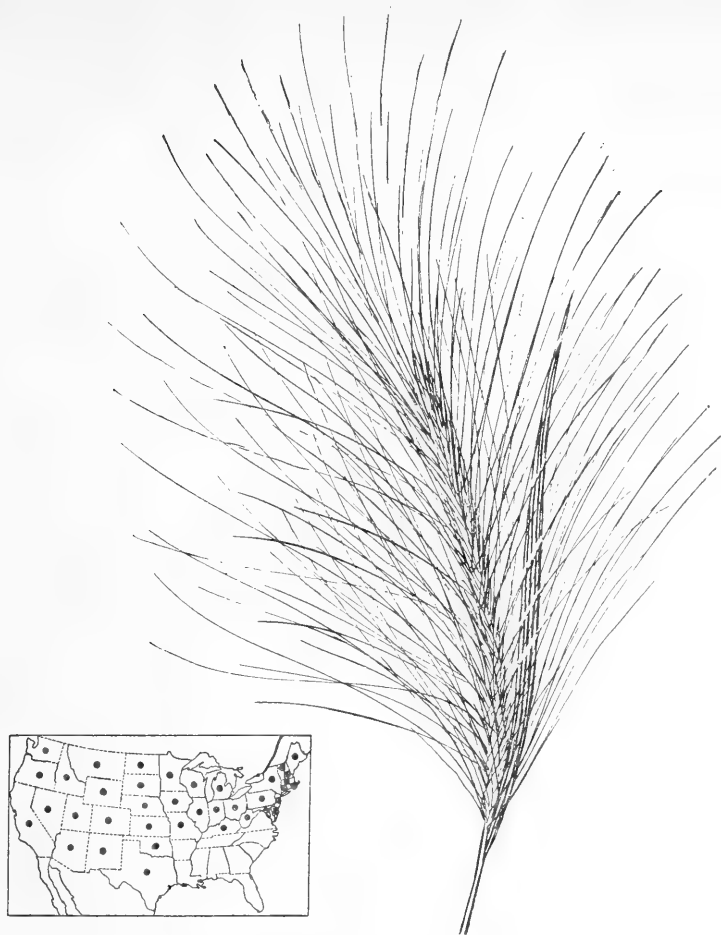


FIGURE 362.—*Hordeum jubatum*, $\times 1$. (Blankinship 189, Mont.)

an empty lateral floret in the same triad), the awn 2 to 5 mm. long; spikelets extremely variable, the spike sometimes slender, the perfect floret 5 to 6 mm. long, the awn 5 to 6 mm. (The name *H. nodosum* L. has been misapplied to this species.) ☿ — Meadows, bottom lands, salt marshes, grassy slopes up to 3,000 m., Aleutian Islands and Alaska to California; Labrador, Newfoundland; Montana to New Mexico and Arizona to California; adventive Maine, Indiana, Mississippi.

4. *Hordeum californicum* Covas and Stebbins. Densely tufted perennial; culms slender, 30 to 55 cm. tall; lower sheaths softly retrorse-pubescent to glabrous; blades 2 to 3 mm. wide, the auricle wanting; spike erect, 2.5 to 6 cm. long, mostly purplish; floret of central spikelet 6 to 7 (rarely 8) mm. long, the awn 4 to 10 mm.

long, the rachilla behind the palea often wanting; floret of lateral spikelet much reduced, scarcely distinct from the awn. ☿ — Meadows, dried creek beds, and brushy flats and slopes, Oregon and California; scarce, probably depauperate dry ground plants of the preceding.

5. *Hordeum pusillum* Nutt. LITTLE BARLEY. (Fig. 364.) Annual; culms 10 to 35 cm. tall; blades erect, flat, the auricle wanting; spike erect, 2 to 7 cm. long, 10 to 14 mm. wide; first glume of the lateral spikelets and both glumes of the fertile spikelet dilated above the base, attenuate into a slender awn 8 to 15 mm. long, the glumes very scabrous; lemma of central spikelet awned, of lateral spikelets awn-pointed. ☉ — Plains and open, especially alkaline, ground, Delaware to Washington, south to Florida, southern California, and northern Mexico;



FIGURE 363.—*Hordeum brachyantherum*. Plant, $\times \frac{1}{2}$; group of spikelets and floret, $\times 3$. (Whited 433, Wash.)

adventive in Maine and Pennsylvania; common westward, rare in the Atlantic States; also southern South America. *HORDEUM PUSILLUM* var. *PUBENS* Hitchc. Spike broader; spikelets pubescent; dilated glumes wider. ☉ —Texas to Utah and Arizona.

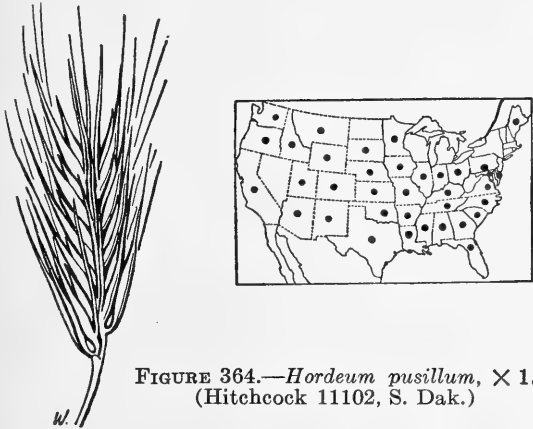


FIGURE 364.—*Hordeum pusillum*, $\times 1$. (Hitchcock 11102, S. Dak.)

6. *Hordeum arizonicum* Covas. (Fig. 365.) Annual; culms geniculate at base, 20 to 60 cm. tall; lower sheaths pubescent, the upper more or less inflated; blades 3 to 5 mm. wide, sparsely pubescent, the auricle wanting; spike erect, 3 to 12 cm. long; floret of central spikelet 8 to 9 mm. long, 1.5 mm. wide, the awn 15 to 22 mm. long, the glumes slightly shorter; glumes of lateral florets nearly as long, one slightly dilated (all awns scabrous, slender, fragile, readily breaking); floret reduced to a small short-awned lemma. (The name *H. adscendens* has been misapplied to this species.) ☉ —Dry open ground (large plants found along irrigation ditches), Arizona and California (Bard).

7. *Hordeum depréssum* (Scribn. and Smith) Rydb. (Fig. 366.) Annual; culms geniculate at base, commonly spreading with ascending ends, 6 to 45 cm. long; upper sheaths often inflated; blades pubescent, mostly not more than 5 cm. long (rarely to 15 cm.); 2 to 4 mm. wide, the auricle wanting; spike erect, 4 to 7 cm. long; floret of central spikelet 7 to 8 mm. long, nearly terete, the awn about 10 mm. long; awns of the glumes and of



FIGURE 365.—*Hordeum arizonicum*, $\times 1$. (Thornber 536, Ariz.)



FIGURE 366.—*Hordeum depréssum*, $\times 3$. (Type.)

the glumes of lateral spikelets nearly equal, the whole triad usually about 2 cm. long; floret of lateral spikelet awnless. ☉ —Mostly in moist alkaline soil or along rivers, also in arid or sterile ground, sea level to 600 m., Idaho and Washington to California.

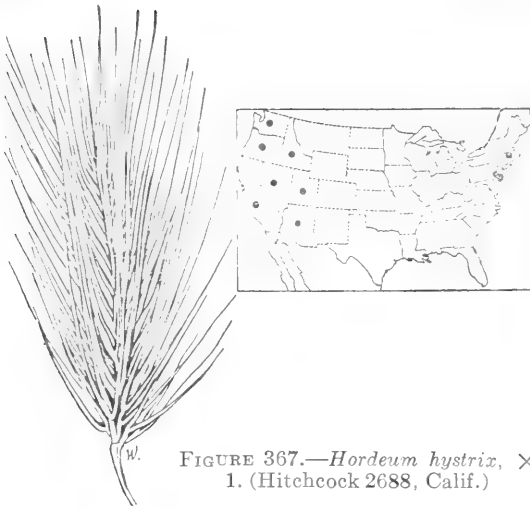


FIGURE 367.—*Hordeum hystrix*, \times 1. (Hitchcock 2688, Calif.)

8. *Hordeum hystrix* Roth. MEDITERRANEAN BARLEY. (Fig. 367.) Annual; culms freely branching and spreading or geniculate at base, 15 to 40 cm. tall; sheaths and blades, especially the lower, more or less pubescent, the auricle wanting; spike erect, 1.5 to 3 cm. long, 10 to 15 mm. wide, the axis usually not readily breaking; glumes setaceous, rigid, nearly glabrous to scabrous, about 12 mm. long; lemma of central spikelet 5 mm. long, the awn somewhat longer than the glumes; floret of lateral spikelets reduced, short-awned. ☉ (*H. gussonianum* Parl.)—Fields and waste places, Utah to British Columbia, Arizona, and California; adventive in Massachusetts, New Jersey, and Pennsylvania; introduced from Europe.

***Hordeum marinum* Huds.** Differing from *H. hystrix* in the glabrous dissimilar glumes of the lateral spikelets, the outer subulate, the inner somewhat broader. ☉ (*H. maritimum* With.)—On ballast, Camden, N. J.; Europe.

9. *Hordeum leporinum* Link. (Fig. 368.) Annual; branching at base, spreading; sheaths glabrous, blades pilose to glabrous; auricle at base of blade well developed; spike 5 to 9 cm. long, often partly enclosed by the inflated uppermost sheath, the rachis internodes mostly 3 mm. long; glumes of the central spikelet lan-

ceolate, 3-nerved, long-ciliate on both margins, the nerves scabrous, the awn 2 to 2.5 cm. long; floret 1 to 1.2 cm. long, raised on a rachilla segment 1 mm. long, the awn 3 to 4 cm. long; lateral spikelets usually staminate, the glumes much shorter, unlike, the inner similar to those of the central one, the outer setaceous, not ciliate, the lemma broad, 10 to 20 mm. long, the awn 2 to 4 cm. long. ☉ — Weed, fields, waste places and open ground, introduced from southern Europe; here and there in the Eastern States, Massachusetts to Georgia; Vancouver Island and Washington to California, Utah, and Texas. This and *H. stebbinsii* have been confused with *H. murinum* L., of Europe, not known from America.



FIGURE 368.—*Hordeum leporinum*, \times 1. (Mills-paugh 4629, Calif.)

10. *Hordeum stebbinsii* Covas. Similar to the preceding, the culms often shorter and more geniculate; spikes narrower, mostly 9 to 15 mm. wide before beginning to break up, the triads closely ascending and slightly more crowded, the rachis internodes mostly 2 mm. long; florets of lateral spikelets not larger than that of the middle spikelet; all awns mostly shorter and slightly more



FIGURE 369.—*Hordeum vulgare*. Plant, $\times \frac{1}{2}$; group of spikelets and floret, $\times 3$; spike of beardless barley (a), $\times \frac{1}{2}$. (Cult.)

slender. ☉ —Weed, fields, waste places, and open, mostly arid ground, introduced from the Old World, ballast, Mobile, Ala.; adventive, Oklahoma; Idaho and Washington; New Mexico to California. Often difficult to distinguish from the preceding.

11. *Hordeum vulgare* L. BARLEY. (Fig. 369.) Annual; culms erect, 60 to 120 cm. tall; blades flat, mostly 5 to 15 mm. wide, the auricle well developed; spike erect or nearly so, 2 to 10 cm. long, excluding awns, the 3 spikelets sessile; glumes divergent at base, narrow, nerveless, gradually passing into a stout awn; awn of lemma straight, erect, mostly 10 to 15 cm. long. ☉ —Cultivated for the grain, sometimes spontaneous in fields and waste places but not persistent. There are two groups of the cultivated barleys. In the 2-rowed forms (*H. distichon* L.) the lateral

spikelets are fairly well developed but sterile. The probable ancestor for at least a part of these is *H. spontaneum* Koch, of Asia. In the second group all the spikelets produce large seed. These are called 6-rowed (*H. hexastichon* L.) or, if the lateral florets overlap, 4-rowed barleys (in European literature). In some varieties the caryopsis is naked. The ancestor of the 6-rowed barleys is not known but probably was similar to some of our cultivated varieties of this group. HORDEUM VULGARE var. TRIFURCATUM (Schlecht.) Alefeld, BEARDLESS BARLEY. Awns suppressed or variously deformed, commonly 3-cleft, the central division converted into a hooded lobe. Adventive or occasional in grainfields and along roads, Connecticut to New Jersey; South Dakota, Montana; Colorado, Utah, New Mexico; California.

50. LÓLIUM L. RYEGRASS

Spikelets several-flowered, solitary, placed edgewise to the continuous rachis, one edge fitting to the alternate concavities, the rachilla disarticulating above the glumes and between the florets; first glume wanting (except on the terminal spikelet and rarely in 1 or 2 spikelets in a spike), the second outward, strongly 3- to 5-nerved, equaling or exceeding the second floret; lemmas rounded on the back, 5- to 7-nerved, obtuse, acute, or awned. Annuals or perennials, with flat blades and slender, usually flat spikes. Type species, *Lolium perenne*. *Lolium*, an old Latin name for darnel.

Lolium perenne, perennial or English ryegrass, was the first meadow grass to be cultivated in Europe as a distinct segregated species, the meadows and pastures formerly being native species. This and *L. multiflorum*, Italian ryegrass, are probably the most important of the European forage grasses. Both species are used in the United States to a limited extent for meadow, pasture, and lawn. They are of importance in the South for winter forage. In the Eastern States the ryegrasses are often sown in mixtures for parks or public grounds, where a vigorous early growth is required. The young plants can be distinguished from bluegrass by the glossy dark-green foliage. *L. temulentum*, darnel, is occasionally found as a weed in grainfields and waste places. It is in bad repute, because of the presence in the grain of a narcotic poison, said to be due to a fungus. Darnel is supposed to be the plant referred to as the tares sown by the enemy in the parable of Scripture.

- Glume shorter than the spikelet.
Lemmas nearly or quite awnless; culms subcompressed..... 1. L. PERENNE.
Lemmas, at least the upper, awned; culms cylindric..... 2. L. MULTIFLORUM.
Glume as long as or longer than the spikelet. Annuals.
Spike flat; spikelets much wider than the rachis.
Florets plump, 6 to 8 mm. long..... 3. L. TEMULENTUM.
Florets dorsally compressed, 9 to 10 mm. long..... 4. L. PERSICUM.
Spike subcylindric; spikelets scarcely wider than the rachis..... 5. L. SUBULATUM.

1. *Lolium perénne* L. PERENNIAL RYEGRASS. (Fig. 370, B.) Short-lived perennial; culms erect or decumbent at the commonly reddish base, 30 to 60 cm. tall; auricles at summit of sheath, minute or obsolete; foliage glossy, the blades 2 to 4 mm. wide; spike often subfalcate, mostly 15 to 25 cm. long; spikelets mostly 6- to 10-flowered; lemmas 5 to 7 mm. long, awnless or nearly so. ☿ —Meadows and waste places, Newfoundland to Alaska and south to Virginia and California, occasionally farther south; cultivated in meadows, pastures, and lawns, introduced from Europe. Also called English ryegrass. *LOLIUM PERENNE* var. *CRISTÁTUM* Pers. Spikes ovate, the spikelets crowded, horizontally spreading. ☿ —Open ground, Wilmington, Del., and Washington, D. C.; ballast, Salem and Eola, Oreg.; adventive from Europe.

2. *Lolium multiflórum* Lam. ITALIAN RYEGRASS. (Fig. 370, A.) Differing from *L. perénne* in the more robust habit, to 1 m. tall, pale or yellowish at base; auricles at summit of sheaths prominent; spikelets 10- to 20-flowered, 1.5 to 2.5 cm. long; lemmas 7 to 8 mm. long, at least the upper awned. ☿ (*L. italicum* A. Br.)—About the same range as *L. perénne*, especially common on the Pacific coast where it is often called Australian ryegrass. Introduced from Europe. Closely related to *L. perénne*, but generally recognized as distinct agriculturally. A much reduced form has been called forma *microstachyum* Uechtritz.—California.

LOLIUM MULTIFLORUM var. *RAMÓSUM* Guss. A peculiar form, the spike transformed into a narrow many-flowered panicle. ☿ —Linn County, Oreg., waif. Europe.

3. *Lolium temuléntum* L. DARNEL. (Fig. 371.) Annual; culms 60 to 90 cm. tall; blades mostly 3 to 6 mm. wide; spike strict, 15 to 25 cm. long; glume about 2.5 cm. long, as long as or longer than the 5- to 7-flowered spikelet, firm, pointed; florets plump, the lemmas as much as 8 mm. long,

obtuse, awned, the awn 6 to 12 mm. long. ☉ —Grainfields and waste places, occasional throughout the eastern United States and rather common on the Pacific coast; introduced from Europe. *LOLIUM TEMULENTUM* var. *LEPTOCHAÉTON* A. Br. Lemmas awnless. ☉ —Washington to California, occasional on the Atlantic coast, Maine to Texas; introduced from Europe.

4. *Lolium pérsicum* Boiss. and Hohen. Annual, resembling small plants of *L. temulentum*, branching at the lower nodes; spike 8 to 12 cm. long; spikelets mostly more distant than in *L. temulentum*, the glume three-fourths to as long as the spikelet, the florets mostly 9 to 10 mm. long, not plump, the awn slender, commonly flexuous, the palea slightly exceeding the lemma. ☉ —A weed in wheatfields and waste ground, Ontario to Alberta, and in North Dakota, becoming a bad weed. Introduced, probably in wheat seed from Russia.

5. *Lolium subulátum* Vis. (Fig. 372.) Annual; culms freely branching at base, stiffly spreading or prostrate; foliage scant, blades short; spike subcylindric, rigid, often curved; spikelets sunken in the excavations of the rachis, the florets partly hidden by the appressed obtuse strongly nerved glume; lemmas 5 mm. long. ☉ —On ballast, near Portland, Oreg.; introduced from Europe.

***Lolium stríctum* Presl.** Annual; branched and spreading at base, 10 to 30 cm. tall; spike thickish, 5 to 10 cm. long, the rachis thick but flattish and angled. ☉ —Ballast, Linnton, Oreg., Berkeley, Calif.; Mohave County, Ariz. Introduced from Europe. Resembles *L. subulatum*, but the spikelets not sunken in a cylindric rachis.

LOLIUM REMÓTUM Schrank. Leafy annual; spike slender, spikelets more or less remote; glume half to two-thirds as long as the spikelets; florets 3 to 4 mm. long, plump, awnless. ☉ —Weed in flax field, North Dakota, the seed from Russia.



FIGURE 370.—A, *Lolium multiflorum*. Plant, $\times \frac{1}{2}$; spikelet, $\times 3$; floret, $\times 5$. (Suksdorf 5142, Wash.) B, *L. perenne*, $\times \frac{1}{2}$. (Kimball, D. C.)



FIGURE 371.—*Lolium temulentum*, $\times \frac{1}{2}$. (Leiberg 771, Oreg.)

Nárdus strícta L. Slender, tufted perennial; sheaths crowded at the base; blades slender, involute, rather stiff; spike slender, 1-sided, 3 to 8 cm. long; spikelets 1-flowered; first glume wanting; second glume minute; lemma narrow, acuminate or short-awned, scabrous. ☉ —Introduced in Newfoundland and Quebec, and sparingly in dry open ground in New Hampshire, New York, and Michigan; Europe.

51. MONÉRMA Beauv.

(Included in *Lepturus* R. Br. in Manual, ed. 1)

Spikelets 1-flowered, embedded in the hard, cylindric articulate rachis and falling attached to the joints; first glume wanting except on the terminal spikelet, the second glume closing the cavity of the rachis and flush with the surface, indurate, nerved, acuminate, longer than the joint of the rachis; lemma with its back to the rachis, hyaline, shorter than the glume, 3-nerved; palea a little shorter than the lemma, hyaline.

Low annual, with slender cylindric spikes. Type species, *M. monandra* Beauv. (*M. cylindrica* (Willd.) Coss. and Dur.) Name from Greek *monos*,

one, and *erma*, support, referring to the single spike.



FIGURE 372.—*Lolium subulatum*, $\times \frac{1}{2}$. (Sheldon, Oreg.)

1. Monerma cylíndrica (Willd.) Coss. and Dur. THINTAIL. (Fig. 373.) Annual; culms bushy-branched, spreading or prostrate, 10 to 30 cm. tall; spike curved, narrowed upward; glume 6 mm. long, acuminate; lemma 5 mm. long, pointed; rachis disarticulating at maturity, the spikelets remaining attached to the joints. ☉ (*Lepturus cylindricus* Trin.)—Salt marshes, San Francisco Bay, Calif., south to San Diego and Santa Catalina Island; introduced from the Old World.

52. PARÁPHOLIS C. E. Hubb.

(Included in *Pholiurus* Trin. in Manual, ed. 1)

Spikelets 1- or 2-flowered, embedded in the cylindric articulate rachis and falling attached to the joints; glumes 2, placed in front of the spikelet and enclosing it, coriaceous, 5-nerved, acute, asymmetric, appearing like halves of a single split glume; lemma with its back to the rachis, smaller than the glumes, hyaline, 1-nerved; palea a little shorter than the lemma, hyaline. Low annuals, with slender cylindric spikes. Type species, *P. incurva* (L.) C. E. Hubb. Name from Greek *para*, beside, and *pholis*, scale, referring to the 2 glumes side by side.



FIGURE 373.—*Monerma cylindrica*. Plant, $\times \frac{1}{2}$; rachis joint and spikelet, $\times 5$. (Parish 4446, Calif.)

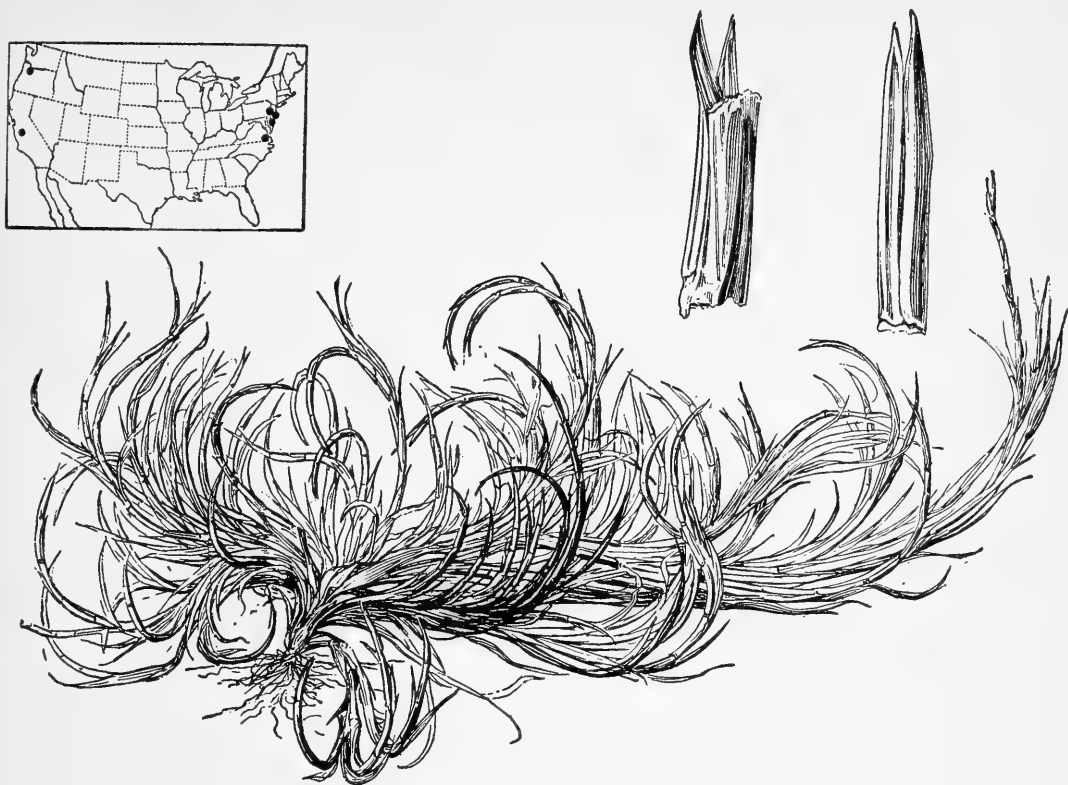


FIGURE 374.—*Parapholis incurva*. Plant, $\times \frac{1}{2}$; rachis joint and spikelet, $\times 5$. (Trask, Calif.)

1. *Parapholis incurva* (L.) C. E. Hubb. SICKLE GRASS. (Fig. 374.) Culms tufted, decumbent at base, 10 to 20 cm. tall; blades short, narrow; spike 7 to 10 cm. long, cylindric, curved; spikelets 7 mm. long, pointed. ☉ (*Pholiurus incurvus* (L.) Schinz and Thell.)—Mud flats and salt marshes along the coast, New Jersey and Pennsylvania to Virginia; California; Portland, Oreg.; introduced from Europe.

53. SCRIBNÉRIA Hack.

Spikelets 1-flowered, solitary, laterally compressed, appressed flatwise against the somewhat thickened continuous rachis, the rachilla disarticulating above the glumes, prolonged as a very minute hairy stipe; glumes equal, narrow, firm, acute, keeled on the outer nerves, the first 2-nerved, the second 4-nerved; lemma shorter than the glumes, membranaceous, obscurely nerved, the apex short-bifid, the faint midnerve extending as a slender awn; palea about as long as



FIGURE 375.—*Scribneria bolanderi*. Plant, $\times \frac{1}{2}$; rachis joint and spikelet, $\times 5$. (Suksdorf 217, Wash.)

the lemma; stamen 1. Low annual, with slender cylindric spikes. Type species, *Scribneria bolanderi*. Named for F. Lamson-Scribner.

1. *Scribneria bolandéri* (Thurb.) Hack. (Fig. 375.) Culms branching at base, erect or ascending, 7 to 30 cm. tall; foliage scant, the blades subfiliform; ligule about 3 mm. long; spike

about 1 mm. thick, usually one-third to half the entire height of the plant, the internodes 4 to 6 mm. long; spikelets about 7 mm. long; lemmas pubescent at base, the awn erect, 2 to 4 mm. long. ☉ —Sandy or sterile ground, in the mountains, Washington to California; rare or overlooked, very inconspicuous.

TRIBE 4. AVENEAE

54. SCHÍSMUS Beauv.

Spikelets several-flowered, the rachilla disarticulating above the glumes and between the florets; glumes subequal, longer than the first floret, usually as long as the spikelet, with white membranaceous margins; lemmas broad, rounded on the back, several-nerved, pilose along the lower part of the margin, the summit hyaline, bidentate; palea broad, hyaline, the nerves at the margin. Low tufted annuals with filiform blades and small panicles, the slender pedicels finally disarticulating at the base and falling with the spikelet or with the glumes. Type species, *Schismus marginatus* Beauv. (*S. barbatus*). Name from Greek, *schismos*, a splitting, referring to the bidentate lemmas. This genus has usually been placed in the tribe Festuceae, but its characters place it more naturally in the tribe Aveneae.

Glumes 4 to 5 mm. long; lemmas about 2 mm. long, rounded and emarginate at apex; palea rounded, as long as the lemma..... 1. *S. BARBATUS*.

Glumes 5 to 6 mm. long; lemmas 2.5 to 3 mm. long, the apex with 2 acute hyaline lobes; palea acute, shorter than the lemma..... 2. *S. ARABICUS*.

1. *Schismus barbátus* (L.) Thell. (Fig. 376.) Culms tufted, erect to prostrate-spreading, 5 to 35 cm. tall; blades usually less than 10 cm. long; panicle oval to linear, 1 to 5 cm. long, usually rather dense, pale or purplish; spikelets about 5-flowered; glumes 4 to 5 mm. long, shorter than the spikelet, 5- to 7-nerved, acute; lemmas about 2 mm. long, 9-nerved, the margin appressed-pilose on the lower half, the teeth minute, sometimes with a mucro between, the rachilla joints slender, flexuous; palea concave, as broad as the lemma and about as long. ☉ —Open ground in yards, along roadsides, and in dry river beds; Utah to California and southern Arizona; Argentina, Chile. Introduced from the Mediterranean region; India to South Africa.

2. *Schismus arábicus* Nees. (Fig. 377.) Resembling *S. barbatus*, culms widely spreading, the spikelets a little larger, 5- to 7-flowered; lemmas 2.5 to



FIGURE 376.—*Schismus barbatus*. Plant, $\times \frac{1}{2}$; spikelet and florets, $\times 5$. (Peebles and Harrison 846, Ariz.)

3 mm. long, longer pilose on the margins and back, the apex cleft into 2 acute lobes, the acute palea reaching the base of the cleft or a little longer.

☉ —Dry open ground, southern Arizona, Nevada (Clark County), and California; Chile; introduced from southwestern Asia or Africa. Locally dominant in Maricopa County, Ariz., and an excellent forage grass in winter; apparently spreading rapidly.



FIGURE 377.—*Schismus arabicus*.
Spikelet, $\times 10$; florets, $\times 5$.
(Peebles 9098, Ariz.)

55. KOELÉRIA Pers.

Spikelets 2- to 4-flowered, compressed, the rachilla disarticulating above the glumes and between the florets, prolonged beyond the perfect florets as a slender bristle or bearing a reduced floret at the tip; glumes usually about equal in length, unlike in shape, the first narrow, sometimes shorter, 1-nerved, the second wider than the first, broadened above the middle, 3- to 5-nerved; lemmas somewhat scarious, shining, the lowermost a little longer than the glume, obscurely 5-nerved, acute or short-awned, the awn, if present, borne just below the apex. Slender, low or rather tall annuals or perennials, with narrow blades and shining spikelike panicles. Type species, *Koeleria cristata*. Named for G. L. Koeler.

Koeleria cristata is a good forage grass and is a constituent of much of the native pasture throughout the Western States. The plants, however, are rather scattering.

| | |
|-----------------------|--------------------------|
| Plants perennial..... | 1. <i>K. CRISTATA</i> . |
| Plants annual..... | 2. <i>K. PHLEOIDES</i> . |

1. *Koeleria cristata* (L.) Pers.

JUNEGRASS. (Fig. 378.) Tufted perennial; culms erect, puberulent below the panicle, 30 to 60 cm. tall; sheaths, at least the lower, pubescent; blades flat or involute, glabrous or, especially the lower, pubescent, 1 to 3 mm. wide; panicle erect, spikelike, dense (loose in anthesis), often lobed, interrupted, or sometimes branched below, 4 to 15 cm. long, tapering at the summit; spikelets mostly 4 to 5 mm. long; glumes and lemmas scaberulous, 3 to 4 mm. long, sometimes short-awned, the rachilla joints very short.

☉ —Prairie, open woods, and sandy soil, Ontario to British Columbia,

south to Delaware, Missouri, Louisiana, California, and Mexico; widely distributed in the temperate regions of the Old World. Variable; several American varieties have been proposed, but the forms are inconstant and intergrading, and it is not practicable to distinguish definite varieties. On the Pacific coast there is a rather large loosely tufted form (*K. cristata* var. *longifolia* Vasey) with long narrow or involute blades and somewhat open panicle.

2. *Koeleria phleoides* (Vill.) Pers. (Fig. 379.) Annual; culms 15 to 30 cm. tall, smooth throughout; sheaths



FIGURE 378.—*Koeleria cristata*. Plant, $\times \frac{1}{2}$; glumes and floret, $\times 10$. (Bebb 2862, Ill.)

and blades sparsely pilose; panicle dense, spike-like, 2 to 7 cm. long, obtuse; spikelets 2 to 4 mm. long; glumes acute; lemmas short-awned from a bifid apex; glumes and lemmas in the typical form papillose-hirsute on the back, but commonly papillose

only. ☉ —Introduced from Europe at Pensacola, Fla., Mobile, Ala., Cameron County, Tex., Portland, Oreg., and at several points in California. Cultivated in nursery plots at Beltsville, Md., and Tucson, Ariz.

56. SPHENÓPHOLIS Scribn. WEDGEGRASS

Spikelets 2- or 3-flowered, the pedicel disarticulating below the glumes, the rachilla produced beyond the upper floret as a slender bristle; glumes unlike in shape, the first narrow, usually acute, 1-nerved, the second broadly obovate, 3- to 5-nerved, the nerves sometimes obscure, mostly somewhat coriaceous, the margin scarious; lemmas firm, scarcely nerved, awnless or rarely with an awn from just below the apex, the first a little shorter or a little longer than the second glume; palea hyaline, exposed. Slender perennials (rarely annual) with usually flat blades and narrow shining panicles. Type species, *Sphenopholis obtusata*. Name from Greek *sphen*, wedge, and *pholis*, horny scale, alluding to the hard obovate second glume.

All the species are forage grasses but are usually not abundant. The most important are *S. intermedia* and *S. obtusata*.

Panicle dense, usually spike-like, erect or nearly so; second glume subcucullate.

1. *S. OBTUSATA*.

Panicle not dense, lax, nodding, from very slender to many-flowered, but not spike-like.

Spikelets awned..... 6. *S. PALLENS*.

Spikelets awnless (rarely awned in *S. filiformis*).

Lemmas glabrous; second glume acute or subacute; panicle many-flowered.

Second glume about 2.5 mm. long..... 2. *S. INTERMEDIA*.

Second glume about 3.5 mm. long..... 3. *S. LONGIFLORA*.

Lemmas scabrous; second glume broadly rounded at the summit; panicle relatively few-flowered.

Blades rarely more than 10 cm. long, flat, 2 to 5 mm. wide..... 4. *S. NITIDA*.

Blades elongate, flat to subinvolute, mostly less than 2 mm. wide..... 5. *S. FILIFORMIS*.

1. *Sphenopholis obtusata* (Michx.)

Scribn. PRAIRIE WEDGEGRASS. (Fig. 380.) Culms erect, tufted, 30 to 100 cm. tall; sheaths glabrous to finely retrorsely pubescent; blades flat, glabrous, scabrous, or pubescent, mostly 2 to 5 mm. wide; panicle erect or nearly so, dense, spike-like to interrupted or lobed, rarely slightly looser, 5 to 20 cm. long; spikelets 2.5 to 3.5 mm. long, the two florets closer together than in the other species; second glume very broad, subcucullate, somewhat inflated at maturity, 5-nerved, scabrous; lemmas minutely papillose, rarely mucronate or with a short straight awn, the first about 2.5 mm. long. 2 — Open woods, old fields, moist ground, and prairies, Maine to British Columbia, south to Florida, Arizona, and California; Mexico; Dominican Republic. Variable in size and in denseness of panicle. Sometimes annual or flowering the first season. Specimens with less dense and lobed panicles may be distinguished from denser paniced specimens of *S. intermedia* by the broader, firmer, subcucullate second glume and more approximate florets.

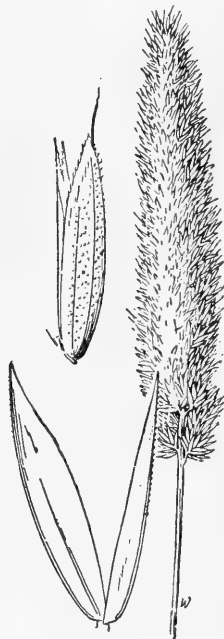


FIGURE 379.—*Koeleria phleoides*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Heller 11417, Calif.)

2. *Sphenopholis intermedia*

(Rydb.) Rydb. SLENDER WEDGEGRASS. (Fig. 381.) Culms erect in small tufts, 30 to 120 cm. tall; sheaths glabrous or pubescent; blades flat, often elongate, lax, mostly 2 to 6 mm. wide, sometimes wider, mostly sca-



FIGURE 380.—*Sphenopholis obtusata*. Plant, $\times \frac{1}{2}$; glumes and floret, $\times 10$. (Hitchcock 1453, N. C.)

berulous, occasionally sparsely pilose; panicle nodding, from rather dense to open, mostly 10 to 20 cm. long, the branches spikelet-bearing from base;

spikelets 3 to 4 mm. long; second glume relatively thin, acute or subacute, about 2.5 mm. long; lemmas subacute, rarely mucronate, smooth

or rarely very minutely roughened, mostly 2.5 to 3 mm. long. 2 —

ulous; glumes very scabrous on the green part, the second thin, acute,

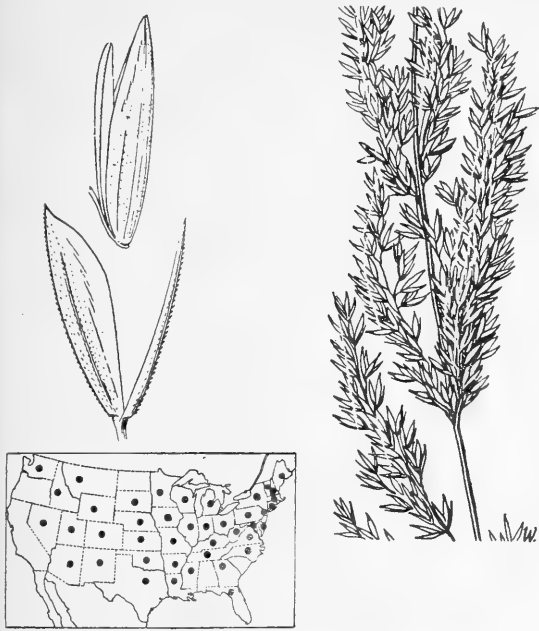


FIGURE 381.—*Sphenopholis intermedia*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Clark 1785, Ind.)



FIGURE 382.—*Sphenopholis longiflora*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Nealley, Tex.)

Damp or rocky woods, slopes, and moist places, Newfoundland to British Columbia, south to Florida and Arizona; Tanana Hot Springs, Alaska. Delicate plants with small panicles resembling *S. nitida* may be distinguished by the very narrow first glume, the acute to subacute second glume and lemmas, and usually by the glabrous foliage. Plants with rather dense panicles resembling *S. obtusata* may be distinguished by the thinner, less rounded, more compressed second glume. This is the species called *Sphenopholis pallens* (Spreng.) Scribn. in some manuals. Bieler's description of *Aira pallens* shows that Scribner misapplied the name (see no. 6).

3. *Sphenopholis longiflora* (Vasey) Hitchc. (Fig. 382.) Culms relatively stout, erect from a decumbent base, 40 to 70 cm. tall; lower sheaths puberulent, the others glabrous; blades thin, flat, scaberulous, 5 to 18 cm. long, 3 to 8 mm. wide; panicle many-flowered, rather loose, slightly nodding, 10 to 18 cm. long; spikelets mostly 2-flowered, the rachilla hispid-

about 3.5 mm. long; lemmas smooth, scaberulous toward the tip, the first about 4 mm. long. 2 — Wooded banks, Arkansas and Texas. Differing from *S. intermedia* in the larger spikelets, broader blades, and more tapering lemmas.

4. *Sphenopholis nitida* (Bieler) Scribn. (Fig. 383.) Culms tufted, leafy at base, slender, shining, 30 to 70 cm. tall; sheaths and blades mostly softly pubescent, occasionally glabrous, the blades 2 to 5 mm. wide, 3 to 10 cm. long, the basal sometimes longer; panicle rather few-flowered, mostly 8 to 12 cm. long, the filiform branches distant, ascending, spreading in anthesis; spikelets 3 to 3.5 mm. long; glumes about equal in length, usually nearly as long as the first floret, the first glume broader than in the other species, the second broadly rounded at summit, at least the second lemma scabrous-papillose. 2 — Dry or rocky woods, Massachusetts to North Dakota, south to Florida and Texas.

5. *Sphenopholis filiformis* (Chapm.) Scribn. (Fig. 384.) Culms erect, very



FIGURE 383.—*Sphenopholis nitida*. Panicle, $\times 1$; glumes and florets, $\times 10$. (House 1920, S. C.)

slender, 30 to 60 cm. tall; blades lax, flat to subinvolute, mostly less than 2 mm. wide; panicle slender, often nodding, 5 to 15 cm. long, the short branches rather distant, erect or ascending; spikelets 3 to 4 mm. long, the 2 florets rather distant; second glume broadly rounded at summit, about 2 mm. long; lemmas obtuse to subacute, rarely with a short spreading awn; the first smooth, the second minutely roughened. $\text{\textcircled{2}}$ —Dry soil, Coastal Plain, southeastern Virginia to Florida, Tennessee, and eastern Texas. Awned lemmas, either the first or second, are occasionally found in some panicles.

6. *Sphenopholis pallens* (Bieler) Scribn. (Fig. 385.) Culms erect, about 60 cm. tall; lower sheaths minutely pubescent, the upper glabrous; blades flat, glabrous, 1 to 2 mm. wide;

panicle narrow, nodding, loose or somewhat compact, 15 to 25 cm. long, the branches ascending, the lower distant; spikelets 2- or 3-flowered, 3 to 3.5 mm. long; second floret scabrous, usually awned just below the apex, the awn scabrous, geniculate, 1 to 2 mm. long. $\text{\textcircled{2}}$ (*Eatonia aristata* Scribn. and Merr.)—Rich wooded slopes, Southampton County, Va., to South Carolina. The type of *Aira pallens* Bieler has not been examined, but it was received from



FIGURE 384.—*Sphenopholis filiformis*. Panicle, $\times 1$; glumes and florets, $\times 10$. (Hitchcock 1044, Ala.)



FIGURE 385.—*Sphenopholis pallens*. Spikelet, $\times 10$. (Curtiss, S. C.)

Muhlenberg and may be assumed to be the same as the specimen in the Muhlenberg Herbarium described under *Aira pallens* by Muhlenberg.

57. TRISÉTUM Pers. TRISETUM

Spikelets usually 2-flowered, sometimes 3- to 5-flowered, the rachilla prolonged behind the upper floret, usually villous; glumes somewhat unequal, acute, the second usually longer than the first floret; lemmas usually short-bearded at base, 2-toothed at apex, the teeth often awned, bearing from the back below the cleft apex a straight and included or usually bent and exserted awn (awnless or nearly so in *Trisetum melicoides* and *T. wolfei*). Tufted perennials (except *Trisetum interruptum*), with flat blades and open or usually contracted or spikelike shining panicles. Type species, *Trisetum flavescens*. Name from Latin *tri*, three, and *setum*, bristle, alluding to the awn and two teeth of the lemma.

Several of the species are valuable for grazing. *Trisetum spicatum* constitutes an important part of the forage on alpine and subalpine slopes and *T. wolfei* at medium altitudes.

Spikelets disarticulating below the glumes.

Plants perennial; panicle lax, somewhat open..... 9. *T. PENNSYLVANICUM*.

Plants annual; panicle narrow, dense, interrupted..... 10. *T. INTERRUPTUM*.

Spikelets disarticulating above the glumes.

Awn included within the glumes, or wanting.

Panicle rather lax, nodding..... 1. *T. MELICOIDES*.

Panicle rather dense, erect..... 2. *T. WOLFEI*.

Awn exserted.

Awn straight (see also *T. montanum* var. *shearii*)..... 3. *T. ORTHOCHAETUM*.

Awn geniculate.

Panicle dense, spikelike, sometimes slightly interrupted below; plants densely tufted..... 5. *T. SPICATUM*.

Panicle loose and open to contracted, but not spikelike; plants in small tufts or solitary.

Panicle relatively few-flowered, loose, lax or drooping, the filiform branches naked below; florets distant..... 4. *T. CERNUUM*.

Panicle many-flowered, from rather loose to dense and interrupted; florets not distant.

Panicle yellowish; spikelets mostly 3- or 4-flowered; introduced.

8. *T. FLAVESCENS*.

Panicle pale green, sometimes purplish-tinged; spikelets usually 2-flowered.

Spikelets about 8 mm. long..... 6. *T. CANESCENS*.

Spikelets 5 to 6 mm. long..... 7. *T. MONTANUM*.

1. *Trisetum melicoides* (Michx.)

Scribn. (Fig. 386.) Culms 50 to 100 cm. tall; sheaths pubescent or scabrous; blades 2 to 8 mm. wide, scabrous, sometimes pubescent on the upper surface; panicle somewhat open, nodding, 10 to 20 cm. long; the branches slender, ascending, lax or drooping, as much as 7 cm. long, rather closely flowered above the middle; spikelets scaberulous, 6 to 7 mm. long; glumes 4 to 6 mm. long, the second longer and broader; lemmas acute, 5 to 6 mm. long, rarely with a minute awn just below the tip, the rachilla and callus hairs 1 to 2 mm. long. ♂ —River banks, lake shores, mostly in gravelly ground,



FIGURE 386.—*Trisetum melicoides*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Pringle, Vt.)

Newfoundland to Vermont, Michigan, and Wisconsin.



FIGURE 387.—*Trisetum wolfii*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Swallen 809, Calif.)

2. *Trisetum wölfii* Vasey. WOLFS TRISETUM. (Fig. 387.) Culms erect, 50 to 100 cm. tall, loosely tufted, sometimes with short rhizomes; sheaths scabrous, rarely the lower pilose; blades flat, scabrous, rarely pilose on the upper surface, 2 to 4 mm. wide; panicle erect, rather dense but scarcely spikelike, green or pale, sometimes a little purplish, 8 to 15 cm. long; spikelets 5 to 7 mm. long, 2-flowered, sometimes 3-flowered; glumes nearly equal, acuminate, about 5 mm. long; lemmas obtusish, scabrous, 4 to 5 mm. long, awnless or with a minute awn below the tip, the callus hairs scant, about 0.5 mm. long, the rachilla internode about 2 mm. long, rather sparingly long-villous. σ —Meadows and moist ground, at medium altitudes in the mountains, Montana to Washington, south to New Mexico and California.

3. *Trisetum orthochaetum* Hitchc. (Fig. 388.) Culms solitary, erect, slender, 110 cm. tall; sheaths glabrous; blades flat, scabrous, 8 to 20 cm. long, 3 to 7 mm. wide; panicle slightly nodding, lax, pale, about 18 cm. long, the filiform branches loosely ascending, naked below, the lower fascicled, as much as 8 cm. long; spikelets short-pedicel, somewhat

appressed, mostly 3-flowered, 8 to 9 mm. long excluding awns, the rachilla appressed-silky; glumes acuminate, about 6 mm. long, the second wider; lemmas rounded on the back, minutely scabrous on the upper part, obscurely 5-nerved, the callus short-pilose, the apex acute, erose-toothed, awned about 2 mm. below the tip, the awn straight or nearly so, exceeding the lemma about 3 mm. σ —Known only from boggy meadows, Lolo Hot Springs, Bitterroot Mountains, Mont.



FIGURE 388.—*Trisetum orthochaetum*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Type.)

4. *Trisetum cernuum* Trin. NODDING TRISETUM. (Fig. 389.) Culms rather lax, 60 to 120 cm. tall; sheaths glabrous to sparsely pilose; blades thin, flat, lax, scabrous, 6 to 12 mm. wide; panicle open, lax, drooping, 15 to 30 cm. long, the branches verticillate, filiform, flexuous, spikelet-bearing toward the ends; spikelets 6 to 12 mm. long, with usually 3 distant florets, the first longer than the second glume; first glume narrow,

acuminate, 1-nerved, 0.5 to 2 mm. long, the second broad, 3-nerved, 3 to 4 mm. long, occasionally reduced; lemma 5 to 6 mm. long, the teeth setaceous, the hairs of the callus 0.5 to 1 mm. long, of the rachilla as much as 2 mm. long, the awns slender, curved, flexuous or loosely spiral, mostly 5 to 10 mm. long, attached 1 to 2 mm. below tip. ♀ —Moist woods, Alberta to southeastern Alaska, south to western Montana and northern California.

5. *Trisetum spicatum* (L.) Richt. SPIKE TRISETUM. (Fig. 390.) Culms densely tufted, erect, 15 to 50 cm. tall, glabrous to puberulent; sheaths and usually the blades puberulent; panicle dense, usually spike-like, often interrupted at base, pale or often dark purple, 5 to 15 cm. long; spikelets 4 to 6 mm. long; glumes somewhat unequal in length, glabrous or scabrous except the keels, or sometimes pilose, the first narrow, acuminate, 1-nerved, the second broader, acute, 3-nerved; lemmas scaberulous, 5 mm. long, the first longer than the glumes, the teeth setaceous; awn attached about one-third below the tip, 5 to 6 mm. long, geniculate, exserted. ♀ —Alpine meadows and slopes, Arctic America, southward to Connecticut, Pennsylvania, northern Michigan and Minnesota, in the mountains to New Mexico and California; also on Roan Mountain, N. C.; high mountains through Mexico to the Antarctic regions of South America; Arctic and alpine regions of the Old World. In northern regions the species descends to low altitudes. Exceedingly variable; several varieties have been proposed, but the characters used to differentiate them are variable and are not correlated. Two rather more outstanding varieties, both intergrading with the species are: *T. spicatum* var. *molle* (Michx.) Beal, with densely pubescent foliage, and *T. spicatum* var. *congdoni* (Scribn. and Merr.) Hitchc., a nearly glabrous alpine form with slightly larger spikelets.



FIGURE 389.—*Trisetum cernuum*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Elmer 1946, Wash.)

6. *Trisetum canescens* Buckl. TALL TRISETUM. (Fig. 391.) Culms erect, or decumbent at base, 60 to 120 cm. tall; sheaths, at least the lower, sparsely to densely and softly retrorse-pilose, rarely scabrous only; blades flat, scabrous or canescent, sometimes sparsely pilose, mostly 2 to 7 mm. wide; panicle narrow, usually loose, sometimes interrupted and spike-like, 10 to 25 cm. long; spikelets about 8 mm. long, 2- or 3-flowered, the florets not so distant as in *T. cernuum*; glumes smooth, except the keel, the first narrow, acuminate, the second broad, acute, 3-nerved, 5 to 7 mm. long; lemmas rather firm, scaberulous, the upper exceeding the glumes, 5 to 6 mm. long, the teeth aristate, the callus hairs rather scant, the rachilla hairs copious; awn geniculate, spreading, loosely twisted below, attached one-third below the tip, usually about 12 mm. long. ♀ —Mountain meadows, moist ravines and along streams, Montana to British Columbia, south to central California. Plants with less pubescent sheaths and looser panicles resemble *T. cernuum* but in that the spikelets are commonly 3-flowered, the florets distant. Plants with more velvety foliage and narrow panicles with short densely flowered



FIGURE 390.—*Trisetum spicatum*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Rydberg and Bessey 3593, Mont.)

branches, the lower in distant fascicles, have been differentiated as *T. projectum* Louis-Marie. Intergrading specimens are more numerous than the extreme described.



FIGURE 391.—*Trisetum canescens*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Hitchcock 3409, Calif.)



FIGURE 392.—*Trisetum montanum*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Type.)

7. *Trisetum montanum* Vasey. (Fig. 392.) Resembling *T. canescens*, on the average smaller, the blades narrower; sheaths from nearly glabrous to softly retrorsely pubescent; panicles smaller than usual in *T. canescens*, more uniformly rather dense, often purple-tinged; spikelets 5 to 6 mm. long, the glumes and lemmas thinner than in *T. canescens*, the awn more delicate, 5 to 8 mm. long. ♀ —Mountain meadows, gulches and moist places on mountain slopes, between 2,000 and 3,300

m., Colorado, Utah, New Mexico, and Arizona. A form with purplish panicles and erect awns only 2 to 3 mm. long, known from a single collection near Silverton, Colo., has been differentiated as *T. montanum* var. *shearii* Louis-Marie.

8. *Trisetum flavescens* (L.) Beauv. (Fig. 393.) Resembling *T. canescens*; sheaths glabrous or the lower sparsely pilose; panicle usually yellowish, many-flowered, somewhat condensed; spikelets mostly 3- or 4-flowered; lemmas 4 to 6 mm. long. ♂ —Waste places, Vermont, New York, Missouri, Colorado, Washington, California, and probably other States; introduced from Europe.

***Trisetum aureum* (Ten.) Ten.** Annual; culms 10 to 20 cm. tall; panicle ovate, contracted, 2 to 3 cm. long; spikelets 3 mm. long; awns 2 to 3 mm. long. ♂ —Ballast, Camden, N. J.; Europe.

9. *Trisetum pennsylvanicum* (L.) Beauv. ex Roem. and Schult. (Fig. 394.) Culms slender, weak, usually subgeniculate at base, 50 to 100 cm. tall; sheaths glabrous or rarely scabrous; blades flat, scabrous, 2 to 5 mm. wide; panicle narrow, loose, nodding, 10 to 20 cm. long; pedicels disarticulating about the middle or toward the base; spikelets 5 to 7 mm.

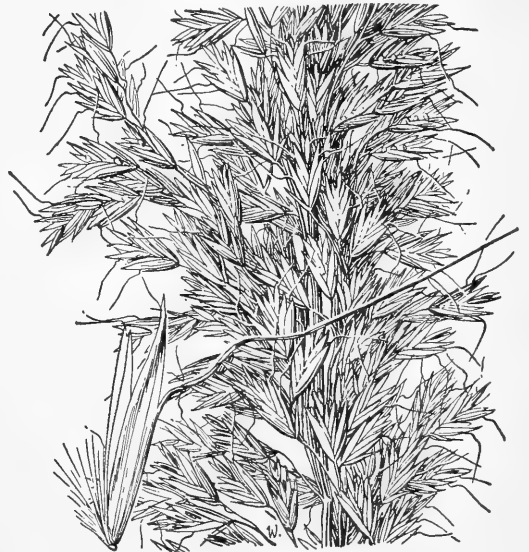


FIGURE 393.—*Trisetum flavescens*. Panicle, $\times 1$; floret, $\times 5$. (Grant 26, Wash.)



FIGURE 394.—*Trisetum pennsylvanicum*. Panicle, $\times 1$; glumes and florets, $\times 5$. (Heller 4800, Pa.)



FIGURE 395.—*Trisetum interruptum*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Jermy, Tex.)

long, 2-flowered, the long rachilla internodes slightly hairy; glumes mostly 4 to 5 mm. long, acute, the second wider; lemmas acuminate, the first usually awnless, the second awned below the 2 setaceous teeth, the awn horizontally spreading, 4 to 5 mm. long. ☐ —Swamps and wet places, Massachusetts to Ohio and West Virginia, south on the Coastal Plain to Florida and west to Tennessee and Louisiana.

10. *Trisetum interruptum* Buckl. (Fig. 395.) Annual; culms tufted, sometimes branching, erect or spreading, 10 to 40 cm. tall; sheaths often scabrous or pubescent; blades flat, sometimes pubescent, 1 to 4 mm.

wide, mostly 3 to 10 cm. long; panicle narrow, interrupted, from slender to rather dense but scarcely spike-like, 5 to 12 cm. long, sometimes with smaller axillary panicles; pedicels disarticulating a short distance below the summit; spikelets about 5 mm. long, 2-flowered, the second floret sometimes rudimentary; glumes about equal in length, acute, 4 to 5 mm. long, the first 3-nerved, the second a little broader, 5-nerved; lemmas acuminate with 2 setaceous teeth, the awns attached above the middle, flexuous, 4 to 8 mm. long, that of the first lemma often shorter and straight. ☉ —Open dry ground, Texas to Colorado and Arizona.

58. DESCHÂMPsia Beauv. HAIRGRASS

Spikelets 2-flowered, disarticulating above the glumes and between the florets, the hairy rachilla prolonged beyond the upper floret and sometimes bearing a reduced floret; glumes about equal, acute or acutish, membranaceous; lemmas thin, truncate and 2- to 4-toothed at summit, bearded at base, bearing a slender awn from or below the middle, the awn straight, bent or twisted. Low or moderately tall annuals or usually perennials, with shining pale or purplish spikelets in narrow or open panicles. Standard species, *Deschampsia caespitosa*. Included in *Aira* by some authors. Named for Deschamps.

Deschampsia caespitosa is often the dominant grass in mountain meadows, where it furnishes excellent forage.

Plants annual; foliage very scant..... 1. *D. DANTHONIOIDES*.
Plants perennial; foliage not scant, one-third to half the entire length of the culm.

Panicle narrow, the distant branches appressed.

Glumes 4 to 6 mm. long; lemma smooth, not deeply toothed..... 2. *D. ELONGATA*.

Glumes 7 mm. long; lemma scaberulous, deeply toothed or lacerate.

3. *D. CONGESTIFORMIS*.

Panicle open or contracted, if narrow, not more than one-fourth the length of the culm.

Blades thin, flat; glumes exceeding the florets..... 4. *D. ATROPURPUREA*.

Blades firm or filiform; glumes not exceeding the upper floret.

Blades filiform, flexuous; awn exserted, geniculate, twisted..... 5. *D. FLEXUOSA*.

Blades flat or folded, stiff; awn included or slightly exserted, straight.

Panicle open, usually nodding or drooping..... 6. *D. CAESPITOSA*.

Panicle narrow, condensed, erect..... 7. *D. HOLCIFORMIS*.

1. *Deschampsia danthonioides*

(Trin.) Munro ex Benth. ANNUAL HAIRGRASS. (Fig. 396.) Annual; culms slender, erect, 15 to 60 cm. tall; blades few, short, narrow; panicle open, 7 to 25 cm. long, the capillary branches commonly in twos, stiffly ascending, naked below, bearing a few short-pedicelled spikelets toward the ends; glumes 4 to 8 mm. long, 3-nerved, acuminate, smooth except the keel, exceeding the florets; lemmas smooth and shining, somewhat indurate, 2 to 3 mm. long, the base of the florets and the rachilla pilose, the awns geniculate, 4 to 6 mm. long. ☉ —Open ground, Alaska to Montana and Baja California; also Chile.



FIGURE 396.—*Deschampsia danthonioides*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Parish 3300, Calif.)



FIGURE 397.—*Deschampsia elongata*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Swallen 780, Calif.)

Variable in the size of the spikelets. A form described from southern California as *D. gracilis* Vasey, with somewhat laxer panicles, the rather more numerous spikelets only 4 to 5 mm. long, grades into the usual form.

2. *Deschampsia elongata* (Hook.)

Munro ex Benth. SLENDER HAIRGRASS. (Fig. 397.) Culms densely tufted, slender, erect, 30 to 120 cm. tall; blades soft, 1 to 1.5 mm. wide, flat or folded, those of the basal tuft filiform; panicle narrow, as much as 30 cm. long, the capillary branches appressed; spikelets on short appressed pedicels; glumes 4 to 6 mm. long, 3-nerved, equaling or slightly exceeding the florets; lemmas 2 to 3 mm. long, similar to those of *D. danthonioides*, the awns shorter, straight. ☉ —Open ground, Alaska to Wyoming, south to Arizona and California; Mexico; Chile.

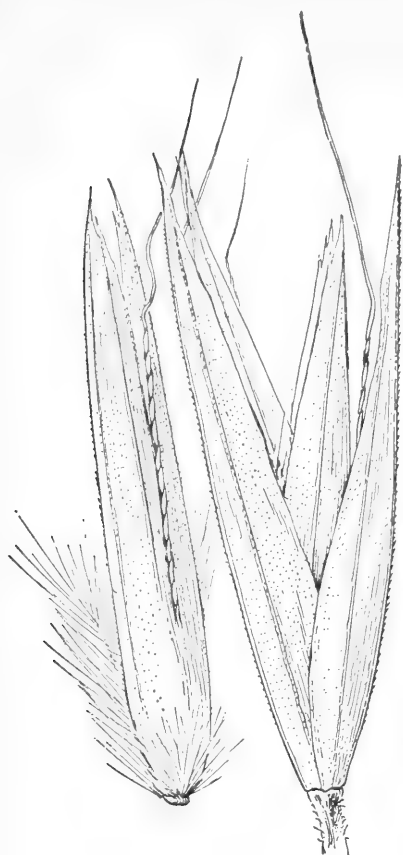


FIGURE 398.—*Deschampsia congestiformis*. Spikelet and floret, $\times 10$. (Type.)

3. *Deschampsia congestiformis* Booth. (Fig. 398.) Culms in small tufts, slender, 45 to 70 cm. tall, scaberulous above; sheaths scaberulous toward the summit; ligule 1.5 to 3 mm. long; blades flat or folded, scabrous on both surfaces, 2 to 3 mm. wide, the basal 10 to 30 cm. long, those of the culm 3 to 8 cm. long, those of the innovations sub-filiform; panicle long-exserted, 6.5 to 10 cm. long, narrow, condensed, the short branches erect, the axis and branches slender, hirtellous; spikelets short-pedicelated, appressed, 7 to 10 mm. long; glumes about 7 mm. long, scabrous, especially on the midnerve; lemmas 7 to 8 mm. long, awned from near the base, toothed or lacerate at the apex, sometimes splitting down the back at maturity, the awn twisted and geniculate, exceeding the spikelets 3 to 4 mm., the callus hairs about 0.5 to 1 mm. long, those of the rachilla 1 to 2 mm. long. 2

—Only known from Gallatin Valley, Bozeman, Gallatin County, and from Cooke, Park County, Mont.

4. *Deschampsia atropurpurea* (Wahl.) Scheele. MOUNTAIN HAIR-GRASS. (Fig. 399.) Culms loosely tufted, erect, purplish at base, 40 to 80 cm. tall; blades flat, rather soft, ascending or appressed, 5 to 10 cm. long, 4 to 6 mm. wide, acute or abruptly acuminate; panicle loose, open, 5 to 10 cm. long, the few capillary drooping branches naked below; spikelets mostly purplish, broad; glumes about 5 mm. long, broad, the second 3-nerved, exceeding the florets; lemmas scabrous, about 2.5 mm. long, the callus hairs one-third to half as long, the awn of the first straight, included, of the second, geniculate, exserted. 2 — Woods and wet meadows, Newfound-



FIGURE 399.—*Deschampsia atropurpurea*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Leiberg 2952, Idaho.)

land and Labrador to Alaska, south to the White Mountains of New Hampshire; Colorado and California; northern Eurasia.

5. *Deschampsia flexuosa* (L.) Trin.
CRINKLED HAIRGRASS. (Fig. 400.) Culms densely tufted, erect, slender, 30 to 80 cm. tall; leaves mostly in a basal tuft, numerous, the sheaths scabrous, the blades involute, slender or setaceous, flexuous; panicle loose, open, nodding, 5 to 12 cm. long, the capillary branches naked below, the branchlets spikelet-bearing toward the ends; spikelets 4 to 5 mm. long, purplish or bronze, the florets approximate; glumes 1-nerved, acute, shorter than the florets; lemmas scabrous, the callus hairs about 1 mm. long, the awn attached near the base, geniculate, twisted, 5 to 7 mm. long. 2 — Dry or rocky woods, slopes, and open ground, Greenland to Alaska, south to Georgia, Michigan, and Wisconsin; Arkansas and Oklahoma (Le Flore County); Mexico; Eurasia. A form with yellow-striped foliage (called by gardeners *Aira foliis variegatis*) is occasionally grown for ornament.

6. *Deschampsia caespitosa* (L.) Beauv. TUFTED HAIRGRASS. (Fig. 401.) Culms in dense tufts, leafy at base, erect, 60 to 120 cm. tall; sheaths smooth; blades 1.5 to 4 mm. wide, often elongate, rather firm, flat or folded, scabrous above; panicle loose, open, nodding, 10 to 25 cm. long, the capillary scabrous branches and branchlets spikelet-bearing toward the ends; spikelets 4 to 5 mm. long, pale or purple-tinged, the florets distant, the rachilla internode half the length of the lower floret; glumes 1-nerved or the second obscurely 3-nerved, acute, about as long as the florets; lemmas smooth, the callus hairs short; awn from near the base, from straight and included in the glumes to weakly geniculate and twice as long as the spikelet. 2 — Bogs and wet places, Greenland to Alaska, south to New Jersey, West



FIGURE 400.—*Deschampsia flexuosa*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Hitchcock 16059, N. H.)

Virginia, North Carolina, Illinois, North Dakota, New Mexico, and California; Arctic and temperate regions of the Old World. Variable in size, in width and texture of blades, in shape of the panicle, and in length of awn. The forms which have been segregated as species and varieties are inconstant, and the characters used to distinguish them are not correlated. Rarely with proliferous spikelets. Large plants from Oregon and California have been described under *Deschampsia caespitosa* subsp. *beringensis* (Hultén) Lawr., but are not *D. beringensis* Hultén, of the Aleutians. Tall plants, with long flat blades, elongate panicles, and spikelets, 3 to 4 mm. long, found in Connecticut, have been referred to *D. CAESPITOSA* var. *PARVIFLORA* (Thuill.) Coss. and Germ. They agree with



FIGURE 401.—*Deschampsia caespitosa*. Plant, $\times \frac{1}{2}$; glumes and floret, $\times 10$. (Nelson 3623, Wyo.)



FIGURE 402.—*Deschampsia holciformis*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Bolander, Calif.)

panicle 10 to 25 cm. long, condensed, many-flowered, the branches appressed to subflexuous-ascending, purplish to brownish; spikelets 6 to 8 mm. long; glumes and lemmas scarberulous, the glumes about equaling



FIGURE 403.—*Aira praecox*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Amer. Gr. Natl. Herb. 375, Del.)

specimens from Germany and are probably introduced.

7. *Deschampsia holciformis* Presl. (Fig. 402.) Culms in dense tufts with numerous basal leaves, erect, relatively robust, 50 to 125 cm. tall; blades mostly folded, 20 to 50 cm. long, 2 to 4 mm. wide, rather firm;

the spikelets or shorter, 3-nerved, the lateral nerves of the first often obscure; lemmas awned from below the middle, the awns erect, exceeding the spikelet, the callus hairs short. 2! —Marshes and sandy soil near the coast, Vancouver Island to central California.

59. *AIRA* L.

(*Aspris* Adans.)

Spikelets 2-flowered, disarticulating above the glumes, the rachilla not prolonged; glumes boat-shaped, about equal, 1-nerved or obscurely 3-nerved, acute, membranaceous or subscarious; lemmas firm, rounded on the back, tapering into 2 slender teeth, bearing on the back below the middle a slender geniculate, twisted, usually exserted, awn, this sometimes wanting in the lower floret or reduced; callus minutely bearded. Delicate annuals with lax, subfiliform blades and open or contracted panicles of small spikelets. Type species, *Aira praecox*. *Aira*, an old Greek name for a weed, probably darnel. Weedy grasses of no economic importance, introduced from Europe.

Panicle dense, spikelike..... 1. *A. PRAECOX*.

Panicle open.

Lower floret with awn as long as that of the upper floret..... 2. *A. CARYOPHYLLEA*.

Lower floret awnless or nearly so..... 3. *A. ELEGANS*.

1. *Aira praecox* L. (Fig. 403.) Culms tufted, 10 to 20 cm. tall, usu-

ally erect; panicle narrow, dense, 1 to 3 cm. long; spikelets yellowish, shin-



FIGURE 404.—*Aira caryophyllæa*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 10$. (Heller 3889, Wash.)

ing, 3.5 to 4 mm. long; lemmas with awns 2 to 4 mm. long, that of the lower floret the shorter. ☉ — Sandy open ground, along the coast, New Jersey to Virginia; Vancouver to California.

2. *Aira caryophyllæa* L. SILVER HAIRGRASS. (Fig. 404.) Culms solitary

or in small tufts, erect, 10 to 30 cm. tall; panicle open, the silvery shining spikelets 3 mm. long, clustered toward the ends of the spreading capillary branches; both lemmas with awns about 4 mm. long. ☉ — Open dry ground, Coastal Plain, Massachusetts to Florida and Louisiana; Ohio; com-

mon on the Pacific coast from British Columbia to California; southern South America.

3. *Aira elegans* Willd. ex Gaudin. (Fig. 405.) Resembling *A. caryophyllaea*; panicle more diffuse; spikelets 2.5 mm. long, scattered at the ends of the branches; lemma of lower floret awnless or with a minute awn just below

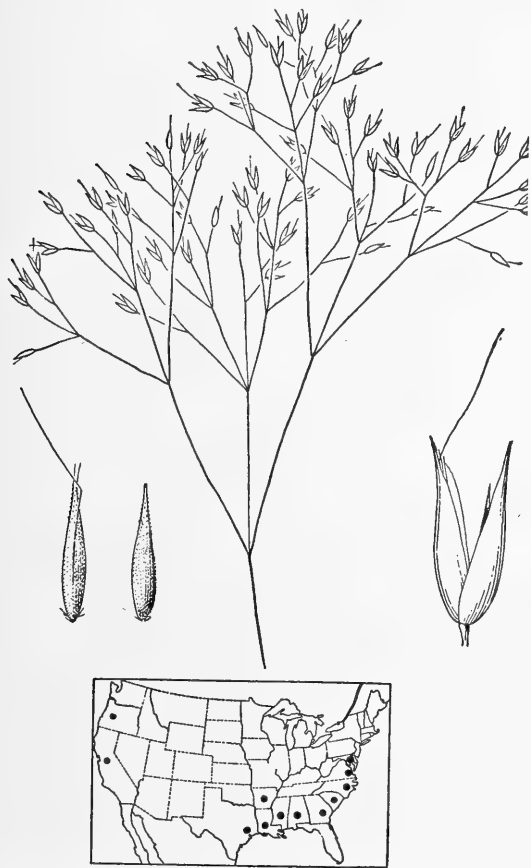


FIGURE 405.—*Aira elegans*. Panicle, $\times 1$; spikelet and florets, $\times 10$. (Davis 2016, S. C.)

the apex, that of the upper floret with an awn 3 mm. long. ☉ (*A. capillaris* Host, not Savi).—Open ground, Coastal Plain, Maryland to Florida; Tennessee; Arkansas and Texas; Oregon and California.

60. CORYNÉPHORUS Beauv.

Spikelets 2-flowered, disarticulating above the glumes; glumes nearly



FIGURE 406.—*Corynephorus canescens*. Spikelet and florets, $\times 10$. (Bicknell, Mass.)

equal, 1-nerved, acute, membranaceous; lemmas thin, acute, awned from near the base, the awn jointed about the middle, the joint with a minute ring of hairs, the lower part straight, brown, the upper slender, club-shaped. Slender annuals with subfiliform blades and narrow panicles. Type species *Corynephorus canescens*. Name from Greek *korynephoros*, club-bearing. One species introduced from Europe.

1. *Corynephorus canescens* (L.) Beauv. (Fig. 406.) Culms tufted, 20 to 35 cm. tall, branching and leafy at base; panicle 5 to 10 cm. long, pale or purplish; spikelets about 3.5 mm. long; florets about 1.7 mm. long, faintly nerved, the callus and rachilla softly pilose, the awns equaling or slightly exceeding the glumes. ☉ —Waste ground and ballast, British Columbia. Marthas Vineyard and Long Island, N. Y., New Jersey, and Pennsylvania.

61. AVÉNA L. OATS

Spikelets 2- or 3-flowered, the rachilla bearded, disarticulating above the glumes and between the florets; glumes about equal, membranaceous or papery, 7- to 9-nerved, longer than the lower floret, usually exceeding the

upper floret; lemmas indurate, except toward the summit, 5- to 9-nerved, bi-dentate, bearing a dorsal bent and twisted awn (straight and reduced in *Avena sativa*), the awn in age commonly breaking at the bend. Low or moderately tall annuals, with narrow or open, usually rather few-flowered panicles of large spikelets. Type species, *Avena sativa*. *Avena*, the old Latin name for oats.

The most important species of the genus is *A. sativa*, the familiar cultivated oat. Two other introduced species, *A. fatua* and *A. barbata*, are known as wild oats because of their close resemblance to the cultivated oat. These two species are common on the Pacific coast where they are often utilized for hay. Much of the grain hay of that region is made from either cultivated or wild oats. The varieties of cultivated oat are derived from three species of *Avena*. The common varieties of this country and of temperate and mountain regions in general are derived from *A. fatua*. The Algerian oat grown in North Africa and Italy and the red oat of our Southern States (*A. byzantina* K. Koch) are derived from *A. sterilis*. A few varieties adapted to dry countries are derived from *A. barbata*.

- Teeth of lemma setaceous; pedicels curved, capillary..... 3. A. BARBATA.
Teeth of lemma acute, not setaceous; pedicels stouter.
Spikelets mostly 2-flowered, the florets not readily separating; awn usually straight or wanting; lemmas glabrous..... 2. A. SATIVA.
Spikelets mostly 3-flowered, the florets readily separating; awn stout, geniculate, twisted; lemmas clothed with stiff brown hairs (hairs sometimes white or scant).
1. A. FATUA.

1. Avena fátua L. WILD OAT. (Fig. 407, A.) Culms 30 to 75 cm. tall, erect, stout; leaves numerous, the blades flat, usually 4 to 8 mm. wide, scabrous; panicle loose and open, the slender branches usually horizontally spreading; spikelets usually 3-flowered; glumes about 2.5 cm. long; rachilla and lower part of the lemma clothed with long stiff brownish, or sometimes whitish, hairs, these sometimes scant; florets readily falling from the glumes; lemmas nerved above, about 2 cm. long, the teeth acuminate, not setaceous; awn stout, geniculate, twisted below, 3 to 4 cm. long. ☉ —Cultivated soil and waste places; introduced from Europe; rare in the Eastern States; Maine to Pennsylvania, Missouri and westward, a common weed on the Pacific coast. Seed used for food by the Indians.

Avena stérilis L. ANIMATED OATS. Resembling *A. fatua*, the spikelets 3.5 to 4.5 cm. long, the awns 5 to 7 cm. long. ☉ —Sometimes cultivated as a curiosity, occasionally spontaneous. When laid on a moist surface the

fruits twist and untwist as the awns lose or absorb moisture. Sometimes used as flies in fishing, the spikelets jerking as the awns untwist.

2. Avena satíva L. OAT. (Fig. 407, B.) Differing from *A. fatua* in having mostly 2-flowered spikelets, the florets not readily separating from the glumes; lemmas glabrous; awn usually straight, often wanting. ☉ —Commonly cultivated and occasionally escaped. In *A. nuda* L., NAKED OAT, the caryopsis readily separates from the lemma and palea. *A. brevis* Roth is a form with smaller spikelets, the lemmas plump, awned. *A. strigosa* Schreb. has a 1-sided panicle, the lemmas scabrous toward the apex, both florets awned.

3. Avena barbáta Brot. SLENDER OAT. (Fig. 408.) Differing from *A. fatua* in the somewhat smaller, mostly 2-flowered spikelets on curved capillary pedicels; lemmas clothed with stiff red hairs, the teeth ending in fine points 4 mm. long. ☉ —A common weed in fields and waste places, Washington and Oregon to Arizona and California.



FIGURE 407.—A, *Avena fatua*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 2$. (Umbach, Ill.) B, *A. sativa*, $\times 2$. (Deam, Ind.)

Cultivated oats fall into three groups, according to the number of chromosomes. Group 1, 7 chromosomes, *A. brevis*, *A. strigosa*. Group 2, 14 chromosomes, *A. barbata*. Group 3, 21 chromosomes, *A. sativa*, *A. fatua* (including *A. orientalis* Schreb.), *A. nuda*, *A. sterilis*, *A. byzantina* (including *A. sterilis* var. *algeriensis* Trabut).

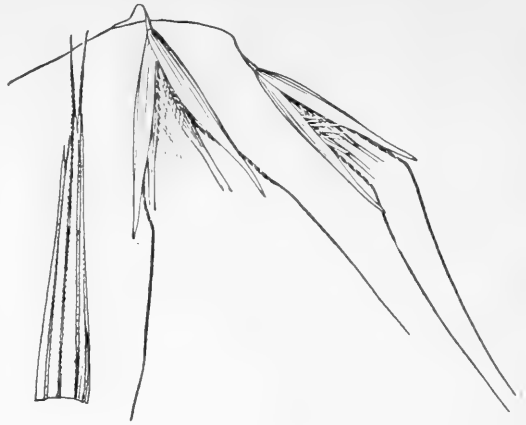


FIGURE 408.—*Avena barbata*. Spikelets, $\times 1$; tip of lemma, $\times 5$. (Davy 5023, Calif.)

62. HELICTOTRÍCHON Besser

(*Avena* sec. *Avenastrum* Koch; included in *Avena* L. in Manual, ed. 1)

Spikelets 3- to several-flowered, the rachilla bearded, disarticulating above the glumes and between the florets; glumes about equal, 3- to 5-nerved, subhyaline except toward the base; lemmas convex, the lower half subindurate and several-nerved, the upper part subhyaline, awned from about the middle, the awns twisted and geniculate, much exceeding the spikelets. Tufted perennials with rather narrow panicles of shining spikelets. Type species, *H. semper-virens* (Vill.) Pilger. Name from *helictos*, twisted, and “trichon,” apparently referring to the awn, which is twisted. Perennials, numerous in Eurasia, 1 introduced and 2 native in western North America.

- | | |
|--|----------------------------|
| Blades involute; panicle 2 to 5 cm. long..... | 3. <i>H. MORTONIANUM</i> . |
| Blades flat or folded; panicle 5 to 15 cm. long. | |
| Sheaths and blades glabrous..... | 2. <i>H. HOOKERI</i> . |
| Sheaths, at least the lower, and blades pubescent..... | 1. <i>H. PUBESCENS</i> . |

1. *Helictotrichon pubescens* (Huds.) Pilger. (Fig. 409.) Culms erect, 50 to 80 cm. tall; sheaths pubescent; blades flat, pubescent; panicle narrow, open, 10 to 15 cm. long, the flexuous branches ascending; spikelets mostly 3-flowered, 12 to 15 mm. long, glumes and lemmas thin, shining, the rachilla with long white hairs; first glume 1- or 3-nerved, the second 3-nerved; lemmas about 1 cm. long; awn attached about the middle, 1.5 to 2 cm. long. 2 —Waste places, Connecticut and Vermont; introduced from Europe.

2. *Helictotrichon hookeri* (Scribn.) Henr. SPIKE OAT. (Fig. 410.) Culms densely tufted, 20 to 40 cm. tall; blades firm, flat or folded, 1 to 3 mm. wide, the margins somewhat thickened; panicle long-exserted, narrow, 5 to 10 cm. long, the branches erect or ascending, 1-flowered, or the lower 2-

flowered; spikelets 3- to 6-flowered, about 1.5 cm. long; glumes very thin, slightly shorter than the spikelet; lemmas firm, brown, scaberulous, 1 to 1.2 cm. long, the callus short-bearded, the rachilla white-villous; awn 1 to 1.5 cm. long. 2 Dry slopes and prairies, Manitoba to Alberta, Minnesota, Montana, and New Mexico.

3. *Helictotrichon mortoniánum* (Scribn.) Henr. ALPINE OAT. (Fig. 411.) Culms densely tufted, 10 to 20 cm. tall; blades erect, firm, usually involute; panicle short-exserted, purplish, narrow, 2 to 5 cm. long, the short branches erect, bearing usually a single spikelet, 10 to 12 mm. long, mostly 2-flowered; glumes exceeding the florets; lemmas firm, glabrous, the apex with 4 soft teeth, the callus with a tuft of stiff hairs about 2 mm. long, the rachilla long-villous; awn 1 to 1.5



FIGURE 409.—*Helictotrichon pubescens*. Glumes and floret, $\times 5$. (Weatherby and Harger 4249, Conn.)

cm. long. 2 —Alpine meadows, Colorado, Utah, and New Mexico.

63. ARRHENATHERUM Beauv.

Spikelets 2-flowered, the lower floret staminate, the upper perfect, the rachilla disarticulating above the glumes and produced beyond the florets; glumes rather broad and papery, the first 1-nerved, the second a little longer than the first and about as long as the spikelet, 3-nerved; lemmas 5-nerved, hairy on the callus, the lower bearing near the base a twisted, geniculate, exserted awn, the upper bearing a short straight slender awn just below the tip. Rather tall perennials, with flat blades and narrow panicles. Type species, *Arrhenatherum avenaceum* Beauv. (*A. elatius*). Name from Greek *arren*, masculine, and



FIGURE 410.—*Helictotrichon hookeri*. Panicle, $\times 1$; floret, $\times 5$. (Scribner 372, Mont.)



FIGURE 411.—*Helictotrichon mortonianum*. Panicle, $\times 1$; floret, $\times 5$. (Type.)

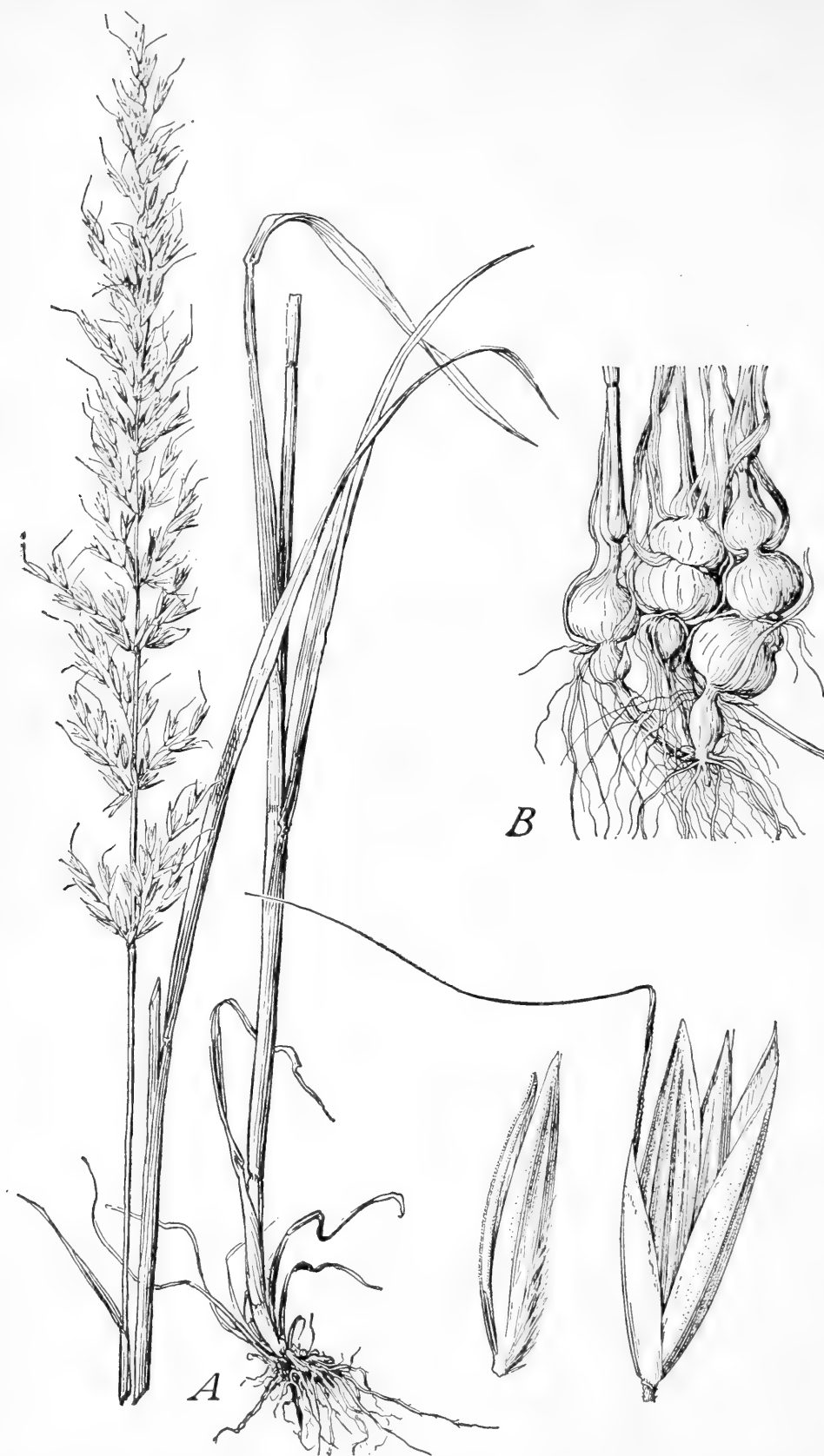


FIGURE 412.—A, *Arrhenatherum elatius*. Plant, $\times \frac{1}{2}$; spikelet and upper floret, $\times 5$. (McDonald 46, Ill.)
B, Var. *bulbosum*. Basal corms, $\times 1$. (Harper, Ala.)

ather, awn, referring to the awned staminate floret.

1. *Arrhenatherum elátius* (L.) Presl. TALL OATGRASS. (Fig. 412, A.) Culms erect, 1 to 1.5 m. tall; blades flat, scabrous, 5 to 10 mm. wide; panicle pale or purplish, shining, 15 to 30 cm. long, the short branches verticillate, spreading in anthesis, usually spikelet-bearing from the base; spikelets 7 to 8 mm. long; glumes minutely scabrous; lemmas scabrous, the awn of the staminate floret about twice as long as its lemma. ♀ —Meadows, open ground, and waste places, Newfoundland to British Columbia, south to Georgia, Tennessee, Iowa, Idaho, Utah, Arizona, and California; frequent in the

Northern and Eastern States; introduced from Europe and escaped from cultivation. Cultivated in the northern humid regions as a meadow grass.

ARRHENATHERUM ELATIUS var. *BULBÓSUM* (Willd.) Spenner. TUBER OATGRASS. (Fig. 412, B.) Base of culm consisting of a series of closely approximate corms (short subglobose internodes) 5 to 10 mm. in diameter. ♀ —Occasionally introduced, Michigan, Virginia, and West Virginia to Alabama; California; Europe.

ARRHENATHERUM ELATIUS var. *BIARISTÁTUM* (Peterm.) Peterm. Both lemmas with well-developed awns. ♀ —Ithaca, N. Y., and Delaware County, Pa.; Europe.

64. *HÓLCUS* L.

(*Notholcus* Nash)

Spikelets 2-flowered, the pedicel disarticulating below the glumes, the rachilla curved and somewhat elongate below the first floret, not prolonged above the second floret; glumes about equal, longer than the 2 florets; first floret perfect, the lemma awnless; second floret staminate, the lemma bearing on the back a short awn. Perennials with flat blades and contracted panicles. Standard species, *Holcus lanatus*. *Holcus*, an old Latin name for a kind of grain.

Rhizomes wanting..... 1. *H. LANATUS*.
Rhizomes present..... 2. *H. MOLLIS*.

1. *Holcus lanátus* L. VELVET GRASS. (Fig. 413.) Plant grayish, velvety-pubescent; culms erect, 30 to 100 cm. tall, rarely taller; blades 4 to 8 mm. wide; panicles 8 to 15 cm. long, contracted, pale, purpletinged; spikelets 4 mm. long; glumes villous, hirsute on the nerves, the second broader than the first, 3-nerved; lemmas smooth and shining, the awn of the second hooklike. ♀ —Open ground, meadows, and moist places, Maine to Kansas and Colorado, south to Georgia and Louisiana; common on the Pacific coast, British Columbia, and Montana to Arizona and California; introduced from Europe; occasionally cultivated as a meadow grass on light or sandy land.

2. *Holcus móllis* L. (Fig. 414.) Culms glabrous, 50 to 100 cm. tall, with vigorous slender rhizomes;

sheaths; except the lower, glabrous; blades villous or velvety, 4 to 10 mm. wide; panicle ovate or oblong, rather loose, 6 to 10 cm. long; spikelets 4 to 5 mm. long; glumes glabrous; awn of the second floret geniculate, exserted, about 3 mm. long. ♀ —Damp places, recently introduced from Europe and apparently spreading, Washington to California; Lewis County, N. Y.; ballast, Camden, N. J., Delaware County, Pa.

65. *SIEGLÍNGIA* Bernh.

Spikelets 4- to 5-flowered, the rachilla disarticulating above the glumes and between the florets; glumes equal, acute, the first 1- to 3-nerved, the second 3- to 5-nerved; lemmas firm, 7- to 9-nerved, bifid, the midnerve excurrent from between



FIGURE 413.—*Holcus lanatus*. Plant, $\times \frac{1}{2}$; spikelet, florets, and mature fertile floret, $\times 5$. (Griffiths 4449 Calif.)

the short teeth in a short flat mucro, the margins densely pilose toward the base. Densely tufted perennial with short narrow blades and narrow, simple, few-flowered panicle. Type species, *Sieglingia decumbens*. Named for Siegling.

1. *Sieglingia decumbens* (L.) Bernh. (Fig. 415.) Culms 20 to 50 cm. tall, erect, densely tufted; leaves crowded toward the base; blades 5 to 15 cm. long or those of the innovations elongate, 2 to 3 mm. wide; panicles 2 to 7 cm. long, the short few-flowered branches appressed; spikelets 8 to 12 mm. long; lemmas 5 to 6 mm. long. 2♂ —Open woods, Long Beach, Wash.; escaped from cultivation, Berkeley, Calif.; Newfoundland and Nova Scotia; Europe. Cleistogamous spikelets sometimes developed in the lower sheaths.



FIGURE 414.—*Holcus mollis*. Plant, $\times 1$; glumes and floret, $\times 5$. (Tracy 2646, Calif.)

66. DANTHÓNIA Lam. and DC. OATGRASS

Spikelets several-flowered, the rachilla readily disarticulating above the glumes and between the florets; glumes about equal, broad, papery, acute, mostly exceeding the uppermost floret; lemmas rounded on the back, obscurely several-nerved, the apex bifid, the lobes acute, usually extending into slender awns, a stout flat, twisted, geniculate awn arising from between the lobes. Tufted low or moderately tall perennials, with few-flowered open or spikelike panicles of rather large spikelets. All our species produce cleistogenes (enlarged fertile, 1- or 2-flowered, cleistogamous spikelets) in the lower sheaths, the culms finally disarticulating at the lower nodes. Type species, *Danthonia spicata*. Named for Etienne Danthoine.

The species are found in grassland and contribute somewhat toward the forage value of the range but usually are not abundant. In California *D. californica* is considered a nutritious grass; *D. compressa* is important in the mountains of North Carolina and Tennessee.

Lemmas glabrous on the back, pilose on the margin only.

Panicle narrow, the pedicels appressed..... 4. *D. INTERMEDIA*.

Panicle open, the slender pedicels spreading or reflexed.

Panicle usually of a single spikelet..... 7. *D. UNISPICATA*.

Panicle of few to several spikelets..... 6. *D. CALIFORNICA*.

Lemmas pilose on the back, sometimes sparsely so.

Glumes mostly 20 to 22 mm. long..... 5. *D. PARRYI*.

Glumes 10 to 17 mm. long.

Sheaths pilose (rarely glabrous); glumes 12 to 17 mm. long. Culms 50 to 100 cm. tall.
3. *D. SERICEA*.

Sheaths glabrous or nearly so; glumes rarely more than 15 mm. long.

Panicle simple or nearly so, usually contracted after anthesis; blades rarely more than 15 cm. long, commonly less..... 1. *D. SPICATA*.

Panicle usually compound and somewhat open; blades or some of them more than 15 cm., often as much as 25 cm. long..... 2. *D. COMPRESSA*.

1. *Danthonia spicata* (L.) Beauv.
ex Roem. and Schult. POVERTY OAT-

GRASS. (Fig. 416.) Culms 20 to 70 cm. tall, mostly not more than 50



FIGURE 415.—*Siegingia decumbens*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Robinson and Schrenk 206. Newfoundland.)

cm., slender, terete; leaves numerous in a basal cluster, the blades usually curled or flexuous; sheaths glabrous or pilose above the nodes, with a

tuft of long hairs in the throat; blades usually not more than 12 cm. long, filiform, to 2 mm. wide, occasionally a few blades 15 to 20 cm. long, sub-

involute or in damp weather flat, glabrous or sparsely pilose; panicle 2 to 5 cm. long, rarely longer, the stiff short branches bearing a single

spikelet, or the lower longer with 2 (rarely 3 or 4), usually erect after anthesis; glumes 10 to 12 mm. long (rarely longer); lemmas 3.5 to 5 mm. long, sparsely villous except the 2-toothed summit, the teeth acuminate to subsetaceous; terminal segment of awn about 5 mm. long; palea broad, flat, obtuse, ciliolate, reaching to the base of the awn. 2. —Dry and sterile or rocky soil, Newfoundland to British Columbia, south to Florida, eastern Texas, and eastern Kansas, in the mountains to New Mexico and Oregon. Variable; tall specimens with longer blades and setaceous teeth resemble *D. compressa*. A rather stiff western form with subsetaceous teeth has been described as *D. thermale* Scribn. Very slender plants with narrow pilose blades and spikelets only 8 to 9 mm. long have been differentiated as var. *longipila* Scribn. and Merr. *D. spicata* var. *pinetorum* (Piper) Piper has been differentiated on variable characters. The basal blades, said to be slightly if at all curling, are closely curled in the type specimen.

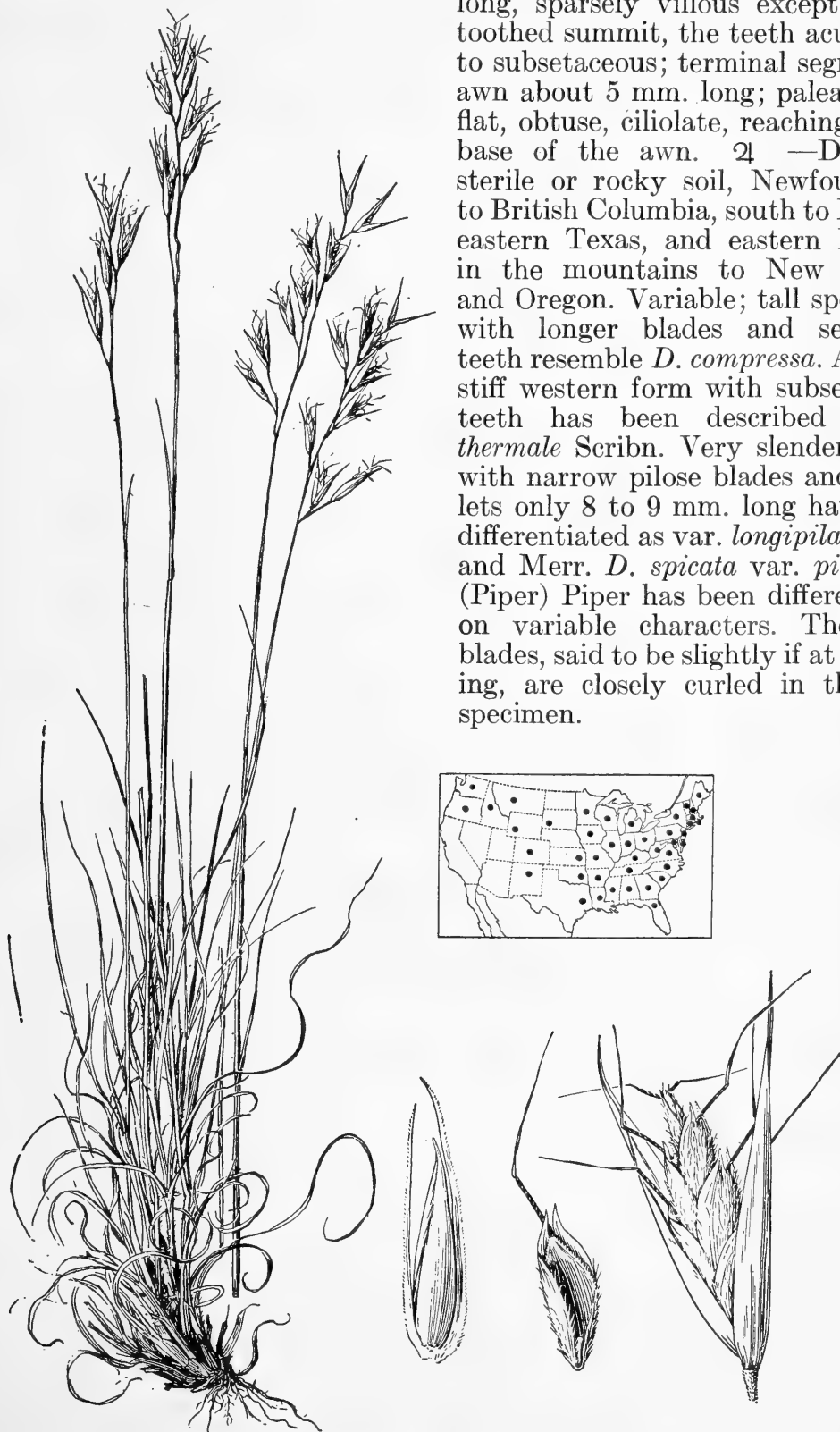


FIGURE 416.—*Danthonia spicata*. Plant, $\times \frac{1}{2}$; spikelet, floret, and cleistogene, $\times 5$. (Gayle 787, Maine.)



FIGURE 417.—*Danthonia compressa*. Panicle, $\times 1$; floret, $\times 5$. (Hitchcock 103, Tenn.)



FIGURE 418.—*Danthonia sericea*. Panicle, $\times 1$; floret, $\times 5$. (Kearney 1219, Va.)

2. *Danthonia compressa* Austin. (Fig. 417.) Culms on the average stouter and taller than in *D. spicata*, compressed, rather loosely tufted, sometimes decumbent or with short rhizomes, 40 to 80 cm. tall; sheaths reddish above the nodes, glabrous, or sparsely pubescent on the collar,

a conspicuous tuft of white hairs in the throat; blades elongate, some of them commonly 20 to 25 cm. long, 2 to 3 mm. wide, usually flat, sometimes involute and subfiliform, scabrous; panicle 5 to 8 cm. long (rarely to 10 cm.), the slender branches bearing 2 or 3 spikelets, contracted after anthesis but looser than in *D. spicata*; glumes 10 to 14 mm. (usually about 12 mm.) long; lemma and palea as in *D. spicata* but the teeth of the lemma aristate, 2 to 3 mm. long. ♀ —Meadows, and open woods, Nova Scotia to Quebec, Maine to Ohio and south to the mountains of North Carolina and Georgia. Appears to intergrade with *D. spicata*. Taller stouter plants with panicles of 9 to 20 spikelets with glumes 10 to 13 mm. long have been differentiated as *D. allenii* Austin.

3. *Danthonia sericea* Nutt. DOWNY OATGRASS. (Fig. 418.) Culms erect, densely tufted, 50 to 100 cm. tall; sheaths, especially the lower, villous (rarely glabrous); blades 10 to 25 cm. long, 2 to 4 mm. wide, those of the innovations mostly involute, those of the culm mostly flat; panicle 5 to 10 cm. long, relatively many-flowered, the branches bearing 2 to 6 spikelets, rather open or contracted after anthesis; glumes 12 to 17 mm. long; lemmas densely long-pilose, especially along the margin, about 10 mm. long, including the slender aristate teeth, the teeth about half the entire length; palea concave, narrowed toward the 2-toothed apex. ♀ —Sand barrens, chiefly Coastal Plain, Massachusetts (Sherborn); New Jersey to northern Florida, Kentucky, and Louisiana. A rare form with nearly glabrous foliage has been differentiated as *D. epilis* Scribn. (*D. glabra* Nash, not Phil.) Virginia to Georgia.

4. *Danthonia intermedia* Vasey. TIMBER OATGRASS. (Fig. 419.) Culms 10 to 50 cm. tall; sheaths glabrous (the lower rarely pilose) with long hairs in the throat; blades sub-involute, or those of the culm flat,

glabrous or sparsely pilose; panicle purplish, narrow, few-flowered, 2 to 5 cm. long, the branches appressed, bearing a single spikelet; glumes about 15 mm. long; lemmas 7 to 8 mm. long, appressed-pilose along the margin below and on the callus, the summit scaberulous, the teeth acuminate, aristate-tipped; terminal segment of awn 5 to 8 mm. long; palea narrowed above, notched at the apex. 21 —Meadows and bogs, northern and alpine regions. Newfoundland and Quebec to Alaska, south to northern Michigan, New Mexico, and California.

5. *Danthonia parryi* Scribn. PARRY OATGRASS. (Fig. 420.) Culms rather stout, in tough clumps, 30 to 60 cm. tall, somewhat enlarged at base from the numerous overlapping firm persistent sheaths; sheaths glabrous, somewhat pilose at the throat, a glabrous or pubescent line or ridge on the collar, the lower blades falling from the sheaths; blades erect-flexuous, mostly 15 to 25 cm. long, narrow or filiform, flat or involute, glabrous; panicle 3 to 7 cm. long, usually with 3 to 8 spikelets, the branches more or less pubescent, ascending or appressed, the lowermost 1 to 2 cm. long, with 1 or 2 spikelets; glumes 20 to 22 mm. long, rarely less; lemmas about 1 cm. long, rather densely



FIGURE 420.—*Danthonia parryi*. Panicle, $\times 1$; floret, $\times 5$. (Hitchcock 19087, Colo.)



FIGURE 421.—*Danthonia californica*. Panicle, $\times 1$; floret, $\times 5$. (Eastwood 27, Calif.)



FIGURE 419.—*Danthonia intermedia*. Panicle, $\times 1$; floret, $\times 5$. (Hitchcock 11288, Mont.)

to sparsely pilose over the back, strongly pilose on the callus at the sides, the rachilla glabrous, the teeth more or less aristate; terminal segment of awn 8 to 12 mm. long; palea narrowed above, nearly as long as the lemma, 2-toothed. 21 —Open grassland, open woods, and rocky slopes, in the mountains, mostly be-

low timber line, Alberta and Montana to New Mexico.

6. *Danthonia californica* Boland. CALIFORNIA OATGRASS. (Fig. 421.) Culms 30 to 100 cm. tall, glabrous, tending to disarticulate at the nodes; sheaths glabrous, pilose at the throat; blades mostly 10 to 20 cm. long, flat or, especially those of the innovations, involute, glabrous; panicle bearing mostly 2 to 5 spikelets, the pedicels slender, spreading or somewhat reflexed, more or less flexuous, 1 to 2 cm. long, a rather prominent pulvinus at the base of each; glumes 15 to 20 mm. long (rarely less or more); lemmas, excluding awns, 8 to 10 mm. long, pilose on the lower part of the margin and on the callus, otherwise glabrous, the teeth long-aristate; terminal segment of awn 5 to 10 mm. long; palea subacute, usually extending beyond base of awn. ♀ — Meadows and open woods, Montana to British Columbia, south to Colorado, New Mexico, and California.

DANTHONIA CALIFORNICA var. **AMERICANA** (Scribn.) Hitchc. Culms on the average shorter, the tufts usually more spreading; foliage sparsely to conspicuously spreading-pilose; spikelets on the average smaller, but large plants with large spikelets occur, with conspicuously pilose foliage. ♀ — Montana and Wyoming to British Columbia, south to California; Chile. *D. macounii* Hitchc. appears to belong here, differing in having lemmas sparsely pilose on the back. Known only from Nanaimo, Vancouver Island (*Macoun* 78825).

7. *Danthonia unispicata* (Thurb.) Munro ex Macoun. ONE-SPIKE OATGRASS. (Fig. 422.) Culms 15 to 25 cm. tall, in dense spreading tufts; sheaths and blades pilose, the hairs on the sheaths spreading or reflexed; panicle reduced to a single spikelet or sometimes 2, rarely 3, spikelets, the lower usually reduced, their pedicels appressed or ascending, the long pedicel of the terminal spikelet jointed with the culm; spikelets on the average smaller than in *D.*

californica; lemmas usually glabrous, the callus hairy. ♀ — Open or rocky ground, Montana to British Columbia, south to Colorado and California.



FIGURE 422.—*Danthonia unispicata*, $\times 2$. (Davy, Calif.)

DANTHONIA PILÓSA R. Br. Tufted, 30 to 60 cm. tall, the foliage loosely pilose; panicle narrow, several-flowered; spikelets about 6-flowered; glumes 13 to 14 mm. long; florets disarticulating with a sharp hairy callus, the lemma pilose at base and on the margin, often with a few hairs in the middle of the back; teeth with slender awns 6 to 8 mm. long, the central awn 12 to 15 mm. long. ♀ — Introduced from Australia, escaped in Humboldt, Alameda, and Santa Barbara Counties, Calif.

DANTHONIA SEMIANNULÁRIS (Labill.) R. Br. Tufted, 40 to 100 cm. tall, often rather robust; foliage glabrous or nearly so; panicle many-flowered; glumes mostly 10 to 15 mm. long; florets with a slender hairy callus, the lemma pilose at base and with a conspicuous row of long tufted hairs across the middle; teeth tipped with slender awns, 5 to 8 mm. long, the central awn 10 to 20 cm. long. ♀ — Introduced from Australia; planted on range lands in California and escaped in several localities in the State. Extremely variable with several varieties.

DANTHONIA PURPUREA (Thunb.) Beauv. ex Roem. and Schult. Densely tufted perennial, forming thick mats of filiform curly pilose leaves; culms very slender, 1 to 2 cm. tall, with few short blades; panicle subcapitate, of few to several spikelets on short slender pedicels; spikelets about 8 mm. long; glumes dark purple fading to brown; florets about 4 mm. long, with a slender hairy callus, the lemma pilose at base and with small tufts of white hairs across the middle of the back; awn 2 to 3 mm. long. ♀ — Introduced from South Africa, grown in the grass garden of University of California, Berkeley.

TRIBE 5. AGROSTIDEAE

67. CALAMAGRÓSTIS Adans. REEDGRASS

Spikelets 1-flowered, the rachilla disarticulating above the glumes, prolonged behind the palea (in our species, except *Calamagrostis epigeios*) as a short, commonly hairy bristle; glumes about equal, acute or acuminate; lemma shorter and usually more delicate than the glumes, usually 5-nerved, the midnerve exerted as an awn, the callus bearing a tuft of hairs, these often copious and as long as the lemma. Perennial, usually moderately tall grasses, mostly with creeping rhizomes, with small spikelets in open or usually narrow, sometimes spikelike, panicles. Type species, *Arundo calamagrostis* L. Name from Greek *kalamos*, a reed, and *agrostis*, a kind of grass, the type species being a reedy grass. American species belong to the Section Deyeuxia, in which the rachilla is prolonged. In Section Epigeios, of the Old World (one species introduced), the rachilla is not prolonged.

Several species are important native forage grasses. Pinegrass, *C. rubescens*, is a leading range grass in the mountains of Oregon and Washington. Bluejoint, *C. canadensis*, is a source of much of the wild hay of Wisconsin and Minnesota. On the plains and bench lands of Wyoming and northward, *C. montanensis* furnishes forage, especially when young. In low wet lands of the Northern States *C. inexpansa* is grazed especially by horses and cattle.

- 1a. Awn longer than the glumes, geniculate.
 - 2a. Panicle open, the branches spreading, naked below.
 - Blades scattered, 5 to 9 mm. broad, flat; plant mostly more than 1 m. tall.
 1. *C. BOLANDERI*.
 - Blades mostly basal, mostly not more than 2 mm. wide, often involute.
 - Awn about 1 cm. long, much longer than the glumes; blades nearly or quite as long as the flowering culms..... 2. *C. HOWELLII*.
 - Awn only a little exceeding the glumes; blades much shorter than the culms, capillary, sulcate, folded..... 3. *C. BREWERI*.
 - 2b. Panicle compact, the branches appressed, floriferous from base.
 - Blades scattered, broad and flat, 6 to 10 mm. wide..... 4. *C. TWEEDYI*.
 - Blades mostly basal, firm, narrow, becoming involute.
 - Glumes about 1 cm. long, gradually long-acuminate; awn nearly 1 cm. long above the bend..... 5. *C. FOLIOSA*.
 - Glumes 6 to 8 mm. long, abruptly acute or acuminate; awn usually less than 5 mm. long above the bend..... 6. *C. PURPURASCENS*.
- 1b. Awn included or scarcely longer than the glumes, straight or geniculate.
 - 3a. Awn geniculate, protruding sidewise from the glumes; callus hairs rather sparse, shorter than the lemma.
 - Plants tufted, not rhizomatous, less than 40 cm. tall; blades 1 to 2 mm. wide, soon involute, at least toward the tip.
 - Panicles compact, spikelike; northwestern..... 7. *C. MONTANENSIS*.
 - Panicles loose, open, relatively few-flowered; Tennessee..... 8. *C. CAINII*.
 - Plants rhizomatous, mostly more than 60 cm. tall; blades mostly more than 4 mm. wide, flat.
 - Sheaths, or some of them, pubescent on the collar.
 - Callus hairs one-third as long as lemma; western species..... 9. *C. RUBESCENS*.
 - Callus hairs half to three-fourths as long as lemma; eastern species.
 - Palea about as long as the lemma..... 10. *C. PORTERI*.
 - Palea three-fourths as long as the lemma..... 11. *C. PERPLEXA*.
 - Sheaths glabrous on the collar.
 - Culms stout, mostly more than 1 m. tall.
 - Panicles loose, the branches ascending or spreading..... 17. *C. NUTKAENSIS*.
 - Panicles compact..... 18. *C. DENSA*.
 - Culms slender, mostly less than 1 m. tall.
 - Hairs on callus and rachilla scant, less than 1 mm. long.
 - Spikelets 5 mm. long; panicle spikelike..... 19. *C. KOELERIOIDES*.
 - Spikelets 4 mm. long; panicles scarcely spikelike, some of the branches naked below..... 16. *C. PICKERINGII*.
 - Hairs on callus and rachilla rather prominent, at least half as long as the lemma.



FIGURE 423.—*Calamagrostis bolanderi*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Bolander, Calif.)

Callus hairs in 2 tufts, at sides of lemma.

Plants with creeping rhizomes; spikelets 4 to 5.5 mm. long.

Blades thin, glabrous on the upper surface, scaberulous beneath; panicle pale, rather loose; glumes relatively thin, 5 to 5.5 mm. long, scaberulous on the keel toward the summit..... 12. *C. INSPERATA*.

Blades firm, scabrous; panicle tawny to purplish, rather dense; glumes firm, 4 to 4.5 mm. long, scabrous throughout..... 13. *C. LACUSTRIS*.

Plants tufted; spikelets 3.5 to 4 mm. long. 14. *C. FERNALDII*.

Callus hairs surrounding base of lemma..... 15. *C. NUBILA*.

3b. Awn straight (somewhat bent in *C. epigeios* and *C. lactea*), included; callus hairs usually not much shorter than the lemma.

Sheaths pubescent on the collar (see *C. inexpansa* var. *barbulata*). 20. *C. SCRIBNERI*.
Sheaths glabrous on the collar.

Panicle rather loose and open.

Callus hairs copious, about as long as the lemma; awn delicate, straight.

21. *C. CANADENSIS*.

Callus hairs rather scant, about half as long as the lemma; awn stronger, weakly geniculate..... 22. *C. LACTEA*.

Panicle more or less contracted.

Blades flat, rather lax.

Awn attached near the base; rachilla not prolonged..... 29. *C. EPIGEIOS*.

Awn attached at or about middle; rachilla prolonged.

Glumes scabrous; plant green..... 23. *C. CINNOIDES*.

Glumes nearly smooth; plant pale..... 24. *C. SCOPULORUM*.

Blades involute or, if flat, rigid and becoming involute.

Blades broad and short, as much as 5 mm. wide, nearly smooth.

28. *C. CRASSIGLUMIS*.

Blades elongate, smooth or scabrous.

Blades firm, scabrous, rather rigid; ligule 4 to 6 mm. long; panicle firm, dense.

25. *C. INEXPANSA*.

Blades relatively soft, smooth beneath; ligule 1 to 3 cm. long.

Spikelets 3.9 to 4.2 mm. long; panicle 18 to 22 cm. long.

26. *C. CALIFORNICA*.

Spikelets 3 to 3.5 mm. long; panicle 5 to 15 cm. long.... 27. *C. NEGLECTA*.



FIGURE 424.—*Calamagrostis howellii*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Chase 4846, Oreg.)

1. *Calamagrostis bolandéri* Thurb. (Fig. 423.) Culms erect, 1 to 1.5 m. tall, with slender rhizomes; sheaths scabrous; ligule 4 to 5 mm. long; blades flat, 5 to 9 mm. wide, scattered, nearly smooth; panicle open, 10 to 20 cm. long, the branches verticillate, spreading, naked below, the longer 5 to 10 cm. long; glumes 3 to 4 mm. long, purple, scabrous, acute; lemma very scabrous, about

as long as the glumes, the awn from near the base, geniculate, exserted, about 2 mm. long above the bend, the callus hairs short; rachilla pilose, 1 to 2 mm. long. $\text{\textcircled{2}}$ —Bogs and moist ground, prairie or open woods, near the coast, Mendocino and Humboldt Counties, Calif.

2. *Calamagrostis howellii* Vasey. (Fig. 424.) Culms densely tufted, rather slender, ascending, 30 to 60



FIGURE 425.—*Calamagrostis breweri*. Plant, $\times 1$; glumes and floret, $\times 10$. (Bolander 6098, Calif.)

cm. tall; sheaths smooth or slightly scabrous; ligule 2 to 8 mm. long;

blades slender, scabrous on the upper surface, flat or soon involute, especially toward the tip, about as long as the culms, the two cauline shorter, about 1 mm. wide; panicle pyramidal, 5 to 15 cm. long, rather open, the lower branches in whorls, ascending, naked below, 3 to 5 cm. long; spikelets pale or tinged with purple; glumes acuminate, 6 to 7 mm. long; lemma acuminate, a little shorter than the glumes, the awn attached about 2 mm. above the base, geniculate, exerted about 1 cm.; callus hairs and those of the rachilla about half as long as the lemma. ♀ —Perpendicular cliffs, near Columbia River and its tributaries, Washington and Oregon.

3. *Calamagrostis breweri* Thurb. SHORTHAIR. (Fig. 425.) Culms densely tufted, slender, erect, 15 to 30 cm. tall; leaves mostly basal, usually involute-filiform; panicle ovate, purple, 3 to 8 cm. long, the lower branches slender, spreading, few-flowered, 1 to 2 cm. long; glumes 3 to 4 mm. long, smooth, acute; lemma nearly as long as glumes, cuspidate-toothed, the awn from near the base, geniculate, exerted, twisted below, about 2 mm. long above the bend, the callus hairs short, scant; rachilla long-pilose, about half as long as the lemma. ♀ —Mountain meadows of the high Sierra Nevada, Calif., where it is an important range grass.

4. *Calamagrostis tweedyi* (Scribn.) Scribn. (Fig. 426.) Culms erect, 1 to 1.5 m. tall, smooth, with short rhizomes; sheaths smooth, the lower becoming fibrous; blades flat, somewhat scabrous, the cauline 5 to 15 cm. long, as much as 1 cm. wide, those of the innovations narrower and longer; panicle oblong, rather compact, or interrupted below, about 10 cm. long; glumes abruptly acuminate, purple-tinged, 6 to 7 mm. long; lemma about as long as the glumes, the awn exerted about 5 mm., the callus hairs scant, scarcely 1 mm. long; rachilla pilose, 2 mm. long. ♀ —Moist open alpine slopes, Idaho and Cleland Counties, Idaho, and Kittitas County and Cascade Mountain, Wash.

5. *Calamagrostis foliösa* Kearney. (Fig. 427.) Culms tufted, erect, 30 to 60 cm. tall; leaves numerous, crowded toward the base, the sheaths overlapping, the blades involute, firm, smooth, nearly as long as the culm; panicle pale, dense, spikelike, 5 to 12 cm. long; glumes about 1 cm. long, acuminate; lemma 5 to 7 mm. long, acuminate, the apex with 4 setaceous teeth, the awn from near base, geniculate, about 8 mm. long above the bend, the callus hairs numerous, 3

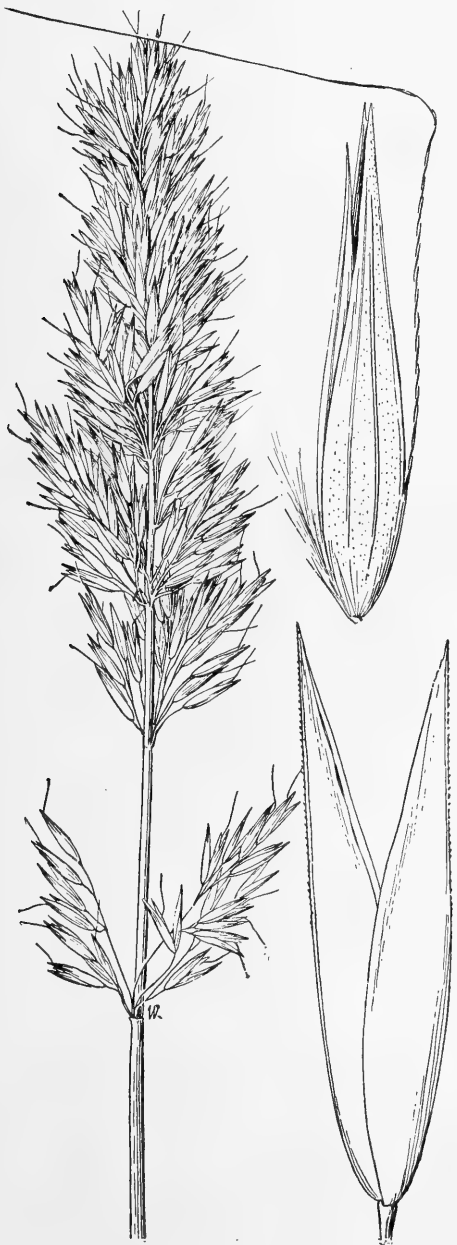


FIGURE 426.—*Calamagrostis tweedyi*. Panicle, × 1; glumes and floret, × 10. (Vasey, Wash.)



FIGURE 427.—*Calamagrostis foliosa*. Panicle, × 1; glumes and floret, × 10. (Davy 6602, Calif.)

mm. long; rachilla pilose, nearly as long as lemma. 2 —Humboldt and Mendocino Counties, Calif.

6. *Calamagrostis purpuräscens* R. Br. PURPLE REEDGRASS. (Fig. 428.) Culms tufted, sometimes with short rhizomes, erect, 40 to 60 cm. or even 100 cm. tall; sheaths usually scabrous, the old sheaths persistent and fibrous; blades 2 to 4 mm. wide, flat or more or less involute, rather thick, scabrous; panicle dense, usually pinkish or purplish, spikelike, 5 to 12 cm. long, rarely longer; glumes 6 to 8 mm. long, scabrous; lemma nearly as long as glumes, the apex with 4 setaceous teeth, the awn from near base, finally geniculate, exserted about 2 mm.; hairs of callus and rachilla about one-



FIGURE 428.—*Calamagrostis purpurascens*. Panicle $\times 1$; glumes and floret, $\times 10$. (Goodding 375, Wyo.)

third as long as the lemma. 2 (C. *vaseyi* Beal.)—Rocks and cliffs, Greenland to Alaska, south to Quebec, South Dakota (Black Hills), Colorado, and California.

7. *Calamagrostis montanensis* Scribn. PLAINS REEDGRASS. (Fig. 429.) Culms stiffly erect, scabrous below the panicle, usually 20 to 40 cm. tall, sometimes taller, with slender creeping rhizomes; lower sheaths rather papery, smooth; blades erect, mostly less than 2 mm. wide, more or less involute, scabrous, sharp-pointed; panicle dense, erect, more or less interrupted, usually pale, 5 to 10 cm. long; spikelets 4 to 5 mm. long, the pedicels very scabrous; glumes acuminate, scabrous; lemma nearly as long as the glumes, finely 4-toothed, the awn attached about 1 mm. above base, about equaling the lemma, slightly geniculate and protruding from side of glumes; palea nearly as long as the lemma; hairs of callus and rachilla rather abundant, about half

as long as the lemma. 2 —Plains and dry open ground, Manitoba to Alberta, south to Minnesota, Wyoming, Colorado, and Idaho.

8. *Calamagrostis cainii* Hitchc. (Fig. 430.) Culms 30 to 60 cm. tall, slender, erect; blades as much as 35 cm. long, 1 to 2 mm. wide, flat or loosely involute, attenuate, scabrous above; panicles 6 to 10 cm. long, pale or purple-tinged, the slender ascending branches 1 to 2 cm. long, few-flowered; glumes narrow, acuminate, 5 to 6 mm. long; lemma acuminate or minutely dentate, the nerves sometimes extending into short mucros, the callus hairs about 1 mm. long; awn attached about 1 mm. above the base, geniculate, a little longer than the glumes; rachilla very short, the hairs 1 to 2 mm. long. 2 —Shrubby summit and open slopes of Mount LeConte, above 5,000 feet, Tenn.



FIGURE 429.—*Calamagrostis montanensis*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Scribner 363, Mont.)

9. *Calamagrostis rubescens* Buckl.

PINEGRASS. (Fig. 431.) Culms slender, tufted, 60 to 100 cm. tall, with creeping rhizomes; sheaths smooth, but pubescent on the collar, sometimes obscurely so; blades erect, 2 to 4 mm. wide, flat or somewhat involute, scabrous; panicle narrow, spikelike or somewhat loose or interrupted, pale or purple, 7 to 15 cm. long; glumes 4 to 5 mm. long, narrow, acuminate; lemma pale, thin, about as long as glumes, smooth, the nerves obscure, the awn from near base, geniculate, exerted from side of glumes, 1 to 2 mm. long above the bend, the callus hairs scant, about one-third as long as the lemma; rachilla 1 mm. long, the sparse hairs extending to 2 mm. 2l —Open pine woods, prairies, and

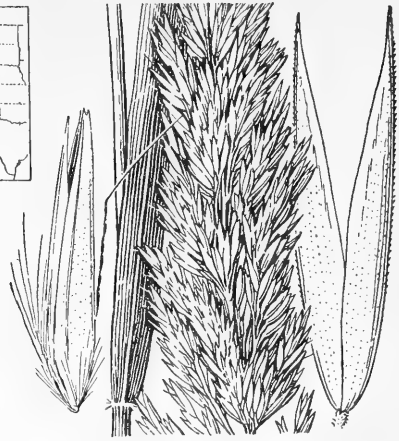


FIGURE 431.—*Calamagrostis rubescens*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Sandberg and Leiberg Wash.)



FIGURE 430.—*Calamagrostis cainii*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Underwood 1210, Tenn.)

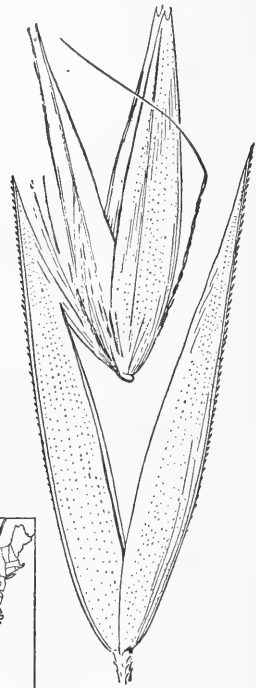


FIGURE 432.—*Calamagrostis porteri*. Glumes and floret, $\times 10$. (Porter, Pa.)

banks, British Columbia, south to northern Colorado and central California. A valuable range grass. A large form with dense lobed panicle has been differentiated as *C. cusickii* Vasey.

10. *Calamagrostis porteri* A. Gray. (Fig. 432.) Culms slender, 60 to 120 cm. tall, with slender rhizomes; sheaths pubescent on the collar; blades flat, spreading, lax, 4 to 8 mm. wide; panicle narrow but rather loose, erect or somewhat nodding, 10 to 15



FIGURE 433.—*Calamagrostis perplexa*. Glumes and floret, $\times 10$. (Metcalf 5668, N. Y.)

cm. long; glumes 4 to 6 mm. long, scaberulous; lemma slightly shorter than the glumes, toothed at apex, the awn from near base, about as long as the lemma, bent and protruding from side of glumes; palea about as long as the lemma; callus hairs in tufts at the sides, rather scant, nearly half as long



FIGURE 434.—*Calamagrostis insperata*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Type.)

as the lemma; rachilla hairs scant, extending to about 3 mm. 21 —Dry rocky soil, New York, Pennsylvania, Virginia (Luray), and West Virginia. Apparently flowering irregularly or rarely.

11. *Calamagrostis perpléxa* Scribn. (Fig. 433.) Culms slender, 90 to 100 cm. tall, with slender rhizomes; lower sheaths overlapping and with reduced blades, the others shorter than the internodes, minutely scaberulous, tomentose at the sides of the collar; ligule 3 to 5 mm. long; blades (except the lower) 15 to 35 cm. long, 3 to 6



FIGURE 435.—*Calamagrostis lacustris*. Glumes and floret, $\times 10$. (Type.)

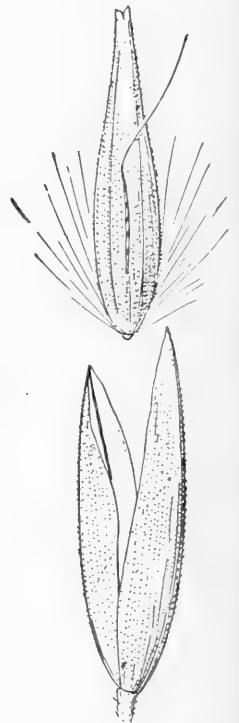


FIGURE 436.—*Calamagrostis fernaldii*. Glumes and floret, $\times 10$. (Fernald 427, Maine.)

mm. wide, scabrous; panicle 10 to 15 cm. long, 2 to 3 cm. wide, many-flowered but rather loose, the axis smooth except toward the apex; spikelets 3.5 to 4 mm. long, the glumes nearly equal, acuminate, scaberulous; lemma 3.5 mm. long, acuminate, the awn from near the base, about as long as the lemma; palea and callus hairs about three-fourths as long as the lemma, the hairs in 2 rather dense

tufts at the sides, the hairs of the rachilla scarcely as long, scant. 2 —Wet rocks, New York (Thatcher's Pinnacle, near Ithaca, type locality).

12. *Calamagrostis insperata* Swallen. (Fig. 434.) Culms 85 to 95 cm. tall, erect from slender creeping rhizomes; sheaths glabrous on the collar; ligule 5 mm. long; blades flat, rather thin, 4 to 8 mm. wide, 10 to 22 cm. long, acuminate, glabrous, the margins scabrous; panicles 12 to 14 cm. long, the branches narrowly ascending, at least some of them naked at the base; spikelets 5 to 5.5 mm. long; lemma 4 mm. long, scaberulous on the keel, the callus hairs in tufts at the sides, rather dense, some of them half to three-fourths as long as the lemma; rachilla 0.5 mm. long, the hairs as much as 2 mm. long; awn from about one-fourth above the base, about as long as the lemma, geniculate. 2 —Known only from Ofer Hollow, Jackson County, Ohio.

13. *Calamagrostis lacustris* (Kearn.) Nash. (Fig. 435.) Culms rather slender from short rhizomes, 35 to 100 cm. tall; sheaths and blades scabrous, the blades firm, 2 to 4 mm. wide; panicle 8 to 15 cm. long, 1 to 2.5 cm. wide, relatively dense, or with one of the lower fascicle of branches naked at base, the axis scabrous; spikelets 4 to 4.5 mm. long; glumes firm, rather broad, scabrous; lemma about 3.5 mm. long, scabrous, the awn from near the base, about as long as the lemma, geniculate; callus hairs about half to two-thirds as long as the lemma, in 2 tufts at the sides; rachilla minute, its hairs exceeding those of the callus. 2 —Mossy rocks, marshy meadows, and sandy shores, Ontario, Vermont, eastern New York, northern Michigan, and eastern Minnesota.

14. *Calamagrostis fernaldii* Louis-Marie. (Fig. 436.) Culms loosely tufted, about 80 cm. tall; sheaths glabrous on the collar; blades elongate, 2 to 4 mm. wide, scabrous on both surfaces; panicle 8 to 9.5 cm. long, narrow, pale; glumes 3.5 to 4 mm.

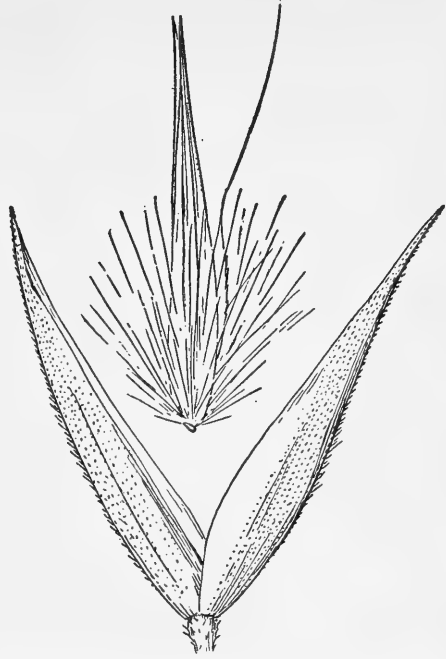


FIGURE 437.—*Calamagrostis nubila*. Glumes and floret, $\times 10$. (Boott, N. H.)

long; lemma 3.2 to 3.6 mm. long, scabrous, minutely toothed, the awn from near the base, scarcely as long as the lemma, the palea about two-thirds as long; callus hairs in tufts at the sides, half to two-thirds as long as the lemma; rachilla hairs two-thirds to three-fourths as long as the lemma. 2 —Wet cliffs, only known from Boarstone Mountain, Piscataquis County, Maine.

15. *Calamagrostis nubila* Louis-Marie. (Fig. 437.) Culms tufted, erect, 55 cm. tall; sheaths mostly overlapping, scaberulous toward the summit; ligule 3 to 5 mm. long; blades flat, 12 to 18 cm. long, 4 to 5 mm. wide, long-attenuate, scabrous on both surfaces, the upper exceeding the inflorescence; panicle pale, 13 to 14 cm. long, about 4 cm. wide, many-flowered but rather loose, probably nodding, the axis and branches flexuous, scabrous; spikelets on short scabrous pedicels; glumes 4.5 to 5.2 mm. long, scabrous, the second indistinctly 3-nerved; lemma 4.5 mm. long, toothed at the acuminate apex, the awn from near base, about as long as the lemma, bent and protruding from side of glumes; palea about two-thirds

as long as the lemma; callus and rachilla hairs rather copious, three-fourths to nearly as long as the lemma. 2 —Only known from Lake of the Clouds, Mount Washington, N. H.

16. *Calamagrostis pickeringii* A. Gray. (Fig. 438.) Culms solitary or few in tufts, rather rigid, scabrous below the panicle, 30 to 60 cm. tall, with creeping rhizomes; blades erect, flat, 4 to 5 mm. wide; panicle purplish, erect, contracted and rather

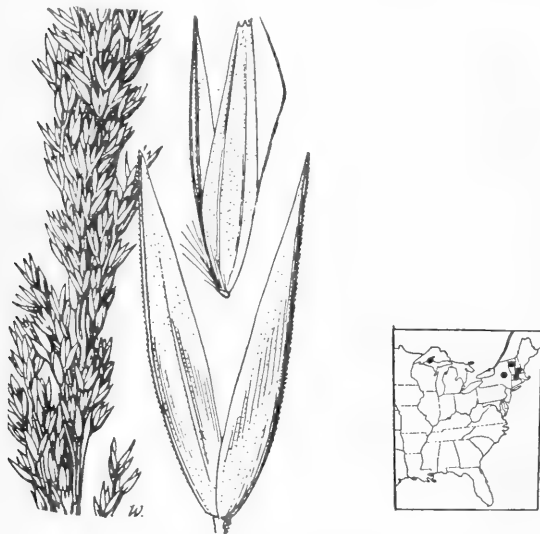


FIGURE 438.—*Calamagrostis pickeringii*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Hubbard 634, Mass.)

dense, 7 to 12 cm. long; glumes acute, about 4 to 4.5 mm. long; lemma a little shorter than the glumes, scaberulous, narrowed to an obtuse point, the awn attached about 1 mm. above the base, about as long as the lemma, slightly bent and protruding somewhat from the side of the glumes; callus hairs in 2 tufts, scant, about 0.5 mm. long; rachilla about 1 mm. long, the hairs short, rather scant. 2 —Bogs, wet meadows, and sandy beaches, Newfoundland and Labrador to the mountains of Massachusetts and New York; Isle Royale, Mich. Slender plants with slightly smaller spikelets have been differentiated as *C. pickeringii* var. *debilis* (Kearney) Fern. and Wieg.

17. *Calamagrostis nutkaensis* (Presl) Steud. PACIFIC REEDGRASS. (Fig. 439.) Culms stout, 1 to 1.5 m. tall with short rhizomes (not usually



FIGURE 439.—*Calamagrostis nutkaensis*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Hitchcock 23576, Oreg.)

present in herbarium specimens); ligule 3 to 8 mm. long; blades elongate, 6 to 12 mm. wide, flat, becoming involute, gradually narrowed into a long point, scabrous; panicle usually purplish, narrow, rather loose, 15 to 30 cm. long, the branches rather stiffly ascending; glumes 5 to 7 mm. long, acuminate; lemma about 4 mm. long, indistinctly nerved, the awn rather stout, from near the base, slightly geniculate, about equaling the lemma or shorter; hairs of callus and rachilla scarcely half as long. 2 —Along the coast in moist soil or wet wooded hills, from Alaska to central California.

18. *Calamagrostis densa* Vasey. CUYAMACA REEDGRASS. (Fig. 440.) Culms rather stout, densely tufted, smooth or scabrous just below the panicle, mostly more than 1 m. tall, with rather stout rhizomes; sheaths slightly scabrous; ligule 3 to 5 mm. long; blades flat, or subinvolute, scabrous, 15 to 25 cm. long, 3 to 8 mm. wide, the uppermost shorter; panicle spikelike, dense, pale, 10 to 15 cm. long; glumes 4.5 to 5 mm. long, acuminate, scaberulous; lemma 3.5 to 4 mm. long, the awn bent, about as long as the lemma, more or less exerted at the side, the hairs of callus and ra-



FIGURE 440.—*Calamagrostis densa*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Hitchcock 13163, Calif.)

chilla scant, about 1 mm. long. 2
—Dry hills, among shrubs, mountains east of San Diego, Calif.

19. *Calamagrostis koelerioides* Vasey. (Fig. 441.) Differs from *C. densa* in the more slender culms and (often purplish) panicles; lemma nearly as long as the glumes. 2
—Dry hills, banks, and meadows, Wyoming to Washington, south to southern California. Possibly a form of *C. densa*.



FIGURE 441.—*Calamagrostis koelerioides*. Glumes and floret, $\times 10$. (Hitchcock 23558, Oreg.)

20. *Calamagrostis scribneri* Beal. SCRIBNER REEDGRASS. (Fig. 442.) Culms tufted, with numerous creeping rhizomes, slender, 60 to 100 cm. tall; lower sheaths loose, thin, upper scabrous, retrorsely pubescent on the collar; ligule about 5 mm. long; blades thin, elongate, 4 to 7 mm. wide, scabrous; panicle pale or purplish, narrow but rather lax, 10 to 15 cm. long (rarely longer); glumes about 4 mm. long, acuminate; lemma a little shorter than the glumes, sharply toothed, the awn about as long as the glumes or a little longer, feebly bent, the callus hairs about half as long as the lemma; rachilla minute, its hairs nearly as long as the lemma. 2 —Moist meadows, Montana and Washington to New Mexico; infrequent.

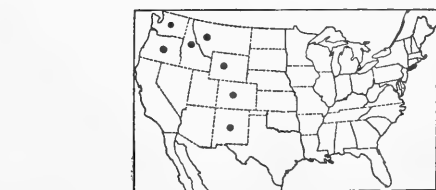
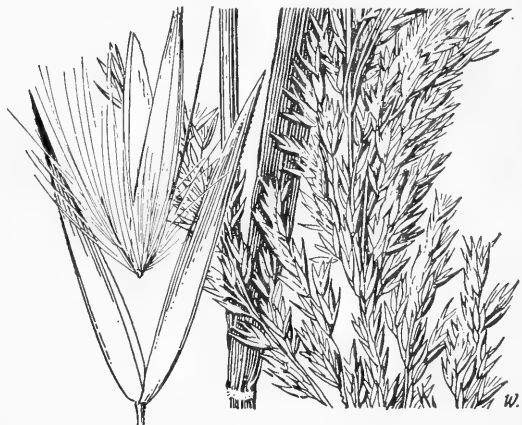


FIGURE 442.—*Calamagrostis scribneri*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Rydberg 3083, Mont.)

21. *Calamagrostis canadensis* (Michx.) Beauv. BLUEJOINT. (Fig.

443, A.) Culms suberect, tufted, 60 to 150 cm. tall, with numerous creeping rhizomes; sheaths glabrous or rarely obscurely pubescent; blades numerous, elongate, flat, rather lax, scabrous, 4 to 8 mm. wide; panicle nodding, from narrow and rather dense to loose and relatively open, especially at base, 10 to 25 cm. long; glumes usually 3 to 4 mm. long, smooth or more commonly scabrous, acute to acuminate; lemma nearly as



FIGURE 443.—A, *Calamagrostis canadensis*. Plant, $\times \frac{1}{2}$; glumes and floret, $\times 10$. (Chase 5077, Mont.) B, Var. *scabra*, $\times 10$. (Pringle, N. H.) C, Var. *macouniana*, $\times 10$. (Pammel 891, Minn.)

long as the glumes, smooth, thin in texture, the awn delicate, straight, attached just below the middle and extending to or slightly beyond its tip, the callus hairs abundant, about as long as lemma; rachilla delicate, sparsely long-pilose. 21 —Marshes wet places, open woods, and meadows, Greenland to Alaska, south to West Virginia and North Carolina (Roan Mountain), Missouri, Kansas, to New Mexico and California. A

proves to be an Old World species not found in America.

CALAMAGROSTIS CANADENSIS var. *MACOUNIÁNA* (Vasey) Stebbins. (Fig. 443, *C.*) Differing from *C. canadensis* in the smaller spikelets, about 2 mm. long. Scarcely a distinct variety. 21 —Saskatchewan (*Macoun* 44, 45), Minnesota (Bemidji), South Dakota (Chamberlain, Redfield), Iowa, Nebraska (Central City), Missouri (Lake City, Little Blue), Montana (Man-

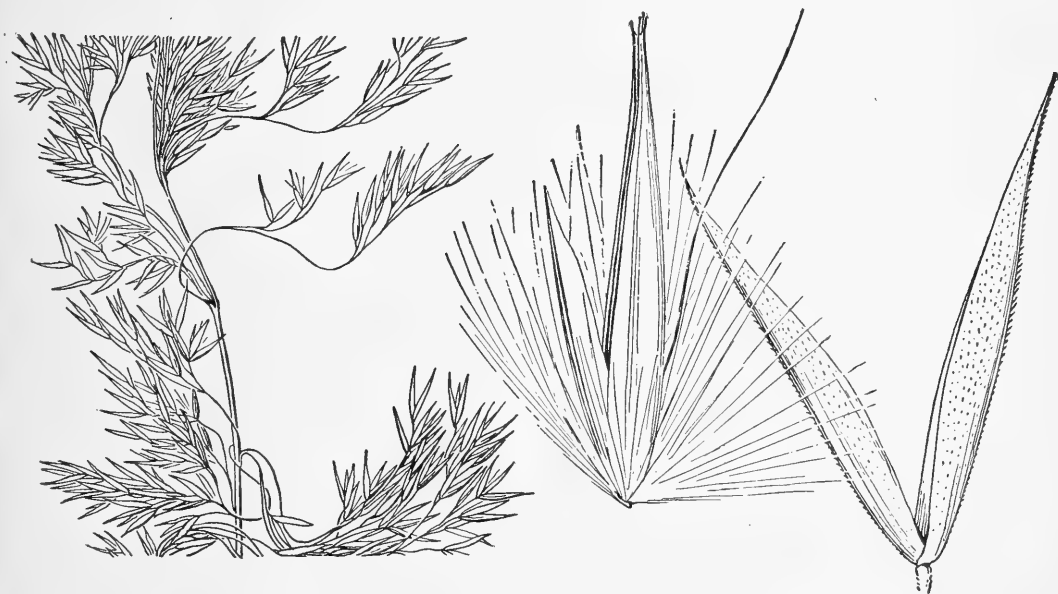


FIGURE 444.—*Calamagrostis lactea*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Dupl. type.)

widely distributed and exceedingly variable species. Characters used to differentiate the many proposed varieties are not correlated in the larger proportion of specimens. The panicle varies in density and the glumes in size and scabridity. The following varieties are recognizable but are connected with the species by many intergrading specimens.

CALAMAGROSTIS CANADENSIS var. *SCÁBRA* (Presl) Hitchc. (Fig. 443, *B.*) Differing in having spikelets 4.5 to 6 mm. long, the glumes rather firm, hispidly short-ciliate on the keel, strongly scabrous otherwise, but the greater scabridity not constant. 21 —Mountains of New England, New York, and northward, and along the Pacific coast from Washington to Alaska. This form has been referred to *C. langsdorfii* (Link) Trin., which

hattan), Yellowstone Park, Washington (Spokane County), Oregon (Crook County).

22. *Calamagrostis láctea* Beal. (Fig. 444.) Culms ascending, 80 to 150 cm. tall, weak, the nodes subgeniculate, with a short knotty rhizome; sheaths scaberulous; ligule rather firm, 3 to 5 mm. long; blades elongate, flat, lax, scabrous, 6 to 12 mm. wide; panicle pale, narrowly pyramidal, 12 to 20 cm. long, loosely flowered; glumes 5 to 6 mm. long, scabrous, acuminate; lemma shorter than the glumes, scabrous, the apex setaceous-toothed, the awn attached near the base, about equaling the lemma, weakly geniculate; palea slightly exceeding the lemma, the callus hairs about half as long; rachilla minute, sparsely pilose. 21

—Mountain slopes, Washington to California; apparently rare.

23. *Calamagrostis cinnoïdes* (Muhl.) Barton. (Fig. 445.) Glau-
cous; culms rather stout, erect, 80
to 150 cm. tall, with slender rhizomes
readily broken off; sheaths and blades
very scabrous, sometimes sparsely
hirsute, the blades flat, 5 to 10 mm.
wide; panicle erect, dense, more or
less lobed (somewhat open at an-
thesis), 8 to 20 cm. long, purple-

scabrous, acute or acuminate, not
awn-pointed; lemma about as long
as the glumes, minutely pilose, the
awn attached above the middle,
straight, about as long as the lemma,
the callus hairs about two-thirds as
long; rachilla rather sparsely long-
pilose, especially on the upper part.
♂ —Moist soil in gulches, Mon-
tana, Wyoming (Wild Cat Peak),
Colorado, Utah, New Mexico, and
Arizona.

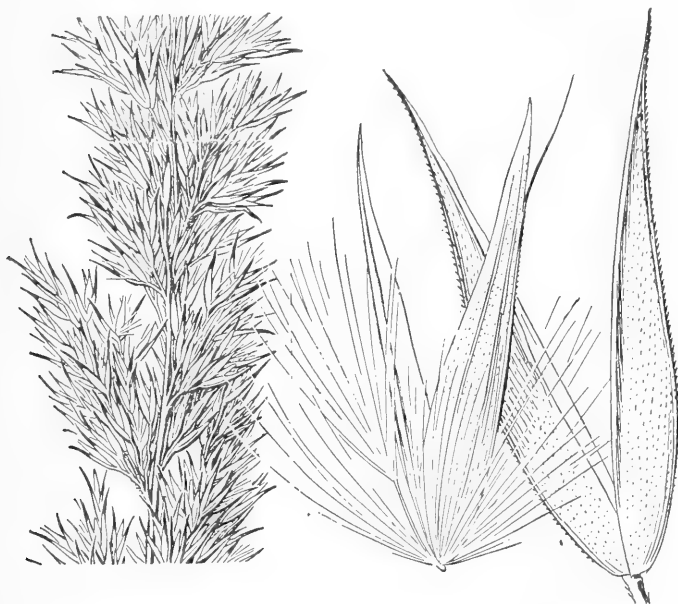


FIGURE 445.—*Calamagrostis cinnoïdes*.
Panicle, $\times 1$; glumes and floret, \times
10. (Chase 7518, Md.)

tinged; glumes 6 to 7 mm. long,
scabrous, long-acuminate or awn-
pointed; lemma firm, acuminate, sca-
brous, shorter than the glumes, the
awn attached about one-fourth below
the tip, not much exceeding the
lemma, the callus hairs copious,
about two-thirds as long; rachilla
about 1 mm. long, glabrous below,
with a brush of long white hairs at
the tip about equaling the lemma.
♂ —Bogs and moist ground, Maine
to New York, south to Alabama
and Louisiana.

24. *Calamagrostis scopulorum*
Jones. (Fig. 446.) Pale, glaucous;
culms erect, 50 to 80 cm. tall, with
short rhizomes; blades elongate, flat,
scabrous, 3 to 7 mm. wide; panicle
pale to purplish, contracted, some-
times spikelike, 8 to 15 cm. long;
glumes 4 to 6 mm. long, somewhat

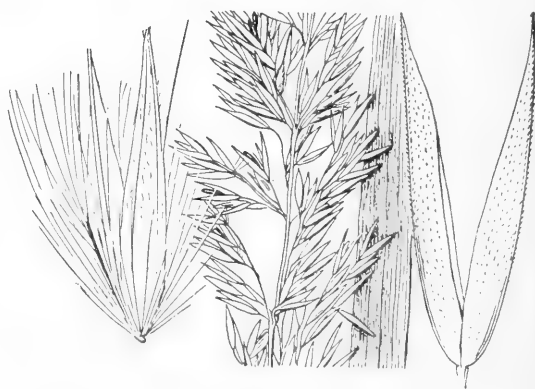


FIGURE 446.—*Calamagrostis scopulorum*. Panicle, $\times 1$;
glumes and floret, $\times 10$. (Jones 1145, Utah.)

25. *Calamagrostis inexpansa* A.
Gray. NORTHERN REEDGRASS. (Fig.
447.) Culms tufted, 40 to 120 cm.
tall, with rather slender rhizomes,
often scabrous below the panicle;
sheaths smooth, or somewhat sca-
brous, the basal ones numerous,

withering but persistent; ligule 4 to 6 mm. long; blades firm, rather rigid, flat or loosely involute, very scabrous, 2 to 4 mm. wide; panicle narrow, dense, the branches mostly erect and spikelet-bearing from the base; 5 to 15 cm. long; glumes 3 to 4 mm. long, abruptly acuminate, scaberulous; lemma as long as glumes, scabrous, the awn attached about the middle, straight or nearly so, about as long as glumes, the callus

—Meadows, marshes, and wet places, Greenland to Alaska, south to Maine, Virginia (Mountain Lake), Washington, New Mexico, and California. *CALAMAGROSTIS INEXPANSA* var. *NÓVAE-ÁNGLIAE* Stebbins. Panicle more loosely flowered, the longer branches naked below. 21 —Wet granite ledges, Maine to Vermont. *CALAMAGROSTIS INEXPANSA* var. *BARBULÁTA* Kearney. Culms robust, puberulent below the nodes; collar of sheaths



FIGURE 447.—*Calamagrostis inexpansa*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Ehlers 566, Mich.)

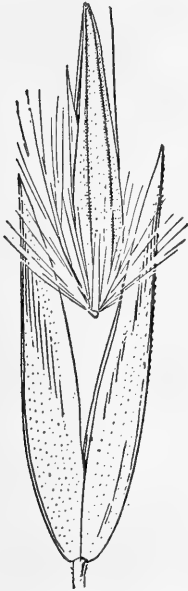


FIGURE 448.—*Calamagrostis californica*. Glumes and floret, $\times 10$. (Type.)

hairs half to three-fourths as long; rachilla 0.5 mm. long, some of the hairs reaching to tip of lemma. 21

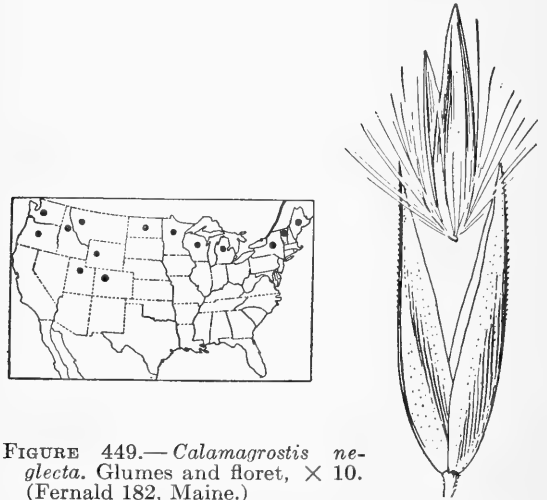


FIGURE 449.—*Calamagrostis neglecta*. Glumes and floret, $\times 10$. (Fernald 182, Maine.)

puberulent; awn minute or obsolete, callus hairs nearly as long as the lemma. 21 —Known only from Mason County, Wash.

26. *Calamagrostis californica* Kearney. (Fig. 448.) Related to *C. inexpansa*, but foliage softer and panicle longer and looser; ligule 2 to 3 mm. long; blades elongate, 1 to 4 mm. wide, mostly involute, scabrous on the upper surface, smooth beneath; panicle 18 to 22 cm. long, the densely flowered branches in rather distant fascicles, some of them naked at base for 1 to 2.5 cm., the axis glabrous; spikelets 3.9 to 4.2 mm. long; glumes acuminate, scabrous; lemma nearly as long as the glumes, strongly nerved, scabrous, the awn attached a little below the middle, straight, scarcely equaling the lemma, the callus hairs scarcely half as long as the lemma, the palea and the hairs of the rachilla about three-

fourths as long. ♀ —Only known from a single collection from the Sierra Nevada, particular locality not known.

27. *Calamagrostis neglécta* (Ehrh.) Gaertn. Mey. and Schreb. (Fig. 449.) Resembling *C. inexpansa*, on the average smaller; ligule 1 to 3 mm. long; blades smooth or nearly so, lax and soft, narrow, often filiform; panicles on the average smaller; glumes rather thinner in texture, often smooth ♀ —Marshes, sandy shores, and wet places, Greenland to Alaska, south to Maine, Vermont, New York, Michigan to Washington, Colorado, and Oregon; northern Eurasia.



FIGURE 450.—*Calamagrostis crassiglumis*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Suksdorf 1024, Wash.)

28. *Calamagrostis crassiglumis* Thurb. (Fig. 450.) Culms rather rigid, 15 to 40 cm. tall, with short rhi-

zomes; lower sheaths overlapping, somewhat papery; blades flat, or somewhat involute, smooth, firm, about 4 to 5 mm. wide; panicle narrow, dense, spikelike, 2 to 5 cm. long, dull purple; glumes 3 to 4 mm. long, ovate, rather abruptly acuminate, purple, scaberulous, firm or almost indurate; lemma about as long as glumes, broad, obtuse or abruptly pointed, the awn attached about the middle, straight, about as long as lemma, the callus hairs abundant, about 3 mm. long; rachilla 1 mm. long, the hairs reaching to apex of lemma. ♀ —Swampy soil, Vancouver Island, Washington (Whatcom Lake), California (Mendocino County). A rare species allied to *C. inexpansa* and *C. neglecta*.

29. *Calamagrostis epigeios* (L.) Roth. (Fig. 451.) Culms 1 to 1.5 m. tall, with extensively creeping rhizomes; ligule about 4 mm. long, rather firm; blades elongate, 4 to 8, sometimes to 13 mm. wide, scabrous; panicle pale, erect, narrow, rather dense, 25 to 35 cm. long; spikelets crowded; glumes subequal, mostly 5 to 6 mm., sometimes to 8 mm., long, narrowly lanceolate, attenuate; lemma scarcely half as long as the glumes, 2-toothed at the apex, the awn mostly from below the middle, delicate, often obscure, slightly bent, about as long as

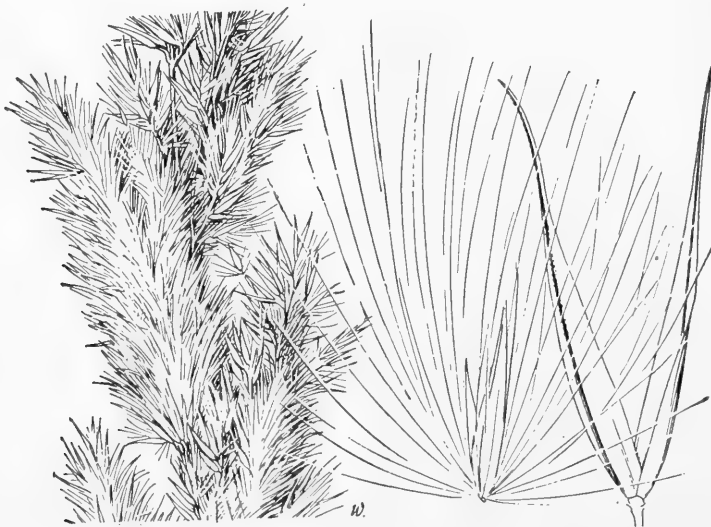


FIGURE 451.—*Calamagrostis epigeios*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Fernald 757, Mass.)

the lemma to equaling the glumes; callus hairs rather copious, about equaling the glumes; rachilla obsolete. 2 —Sandy woods, salt marshes, fields, and waste ground,

near the coast of Massachusetts, Long Island and Saratoga County, N. Y., Montgomery County, Pa., North Dakota to Iowa and Kansas; becoming a weed. Introduced from Eurasia.

68. AMMÓPHILA Host. BEACHGRASS

Spikelets 1-flowered, compressed, the rachilla disarticulating above the glumes, produced beyond the palea as a short bristle, hairy above; glumes about equal, chartaceous; lemma similar to and a little shorter than the glumes, the callus bearded; palea nearly as long as the lemma. Tough, rather coarse, erect perennials, with hard, scaly, creeping rhizomes, long, tough, involute blades, and pale, dense spikelike panicles. Type species, *Ammophila arenaria*. Named from the Greek *ammos*, sand, and *philos*, loving, alluding to the habitat.

The species of *Ammophila* are important sand-binding grasses, *A. arenaria* being used in northern Europe to hold the barrier dunes along the coast. In this country it has been tried with success on Cape Cod and at Golden Gate Park, San Francisco. Called also marram, psamma, and sea sandreed.

Ligule thin, 10 to 30 mm. long..... 2. *A. ARENARIA*.
Ligule firm, 1 to 3 mm. long..... 1. *A. BREVILIGULATA*.

1. *Ammophila breviligulata* Fernald. AMERICAN BEACHGRASS. (Fig. 452.) Culms in tufts, commonly 70 to 100 cm. tall with deep strong extensively creeping rhizomes, the base of the culms clothed with numerous broad overlapping sheaths; ligule firm, 1 to 3 mm. long; blades elongate, firm, soon involute, curved forward past the culm, the scaberulous upper surface downward; panicle pale, 15 to 30 cm. long, nearly cylindrical; spikelets 11 to 14 mm. long; glumes scaberulous, the first 1-nerved, the second 3-nerved; lemma scabrous, the callus hairs about 2 mm. long, the rachilla about 3 mm. long. 2 — Sand dunes along the coast from Newfoundland to North Carolina,

and on the shores of the Great Lakes from Lake Ontario to Lake Superior and Lake Michigan.

2. *Ammophila arenaria* (L.) Link. EUROPEAN BEACHGRASS. (Fig. 453.) Like the preceding in habit, the culms sometimes thicker; ligule thin, 1 to 3 cm. long; panicle often thicker in the middle, tapering to the summit; spikelets 1.2 to 1.5 cm. long; callus hairs about 3 mm. long, the rachilla 2 mm. long. 2 —Sand dunes along the coast from San Francisco to Washington. Introduced as a sand binder in the vicinity of San Francisco and now established at several places to the north; coast of Europe.

69. CALAMOVÍLFA Hack.

Spikelets 1-flowered, the rachilla disarticulating above the glumes, not prolonged behind the palea; glumes unequal, chartaceous, 1-nerved, acute; lemma a little longer than the second glume, chartaceous, 1-nerved, awnless, glabrous or pubescent, the callus bearded; palea about as long as the lemma. Rigid, usually tall perennials, with narrow or open panicles, some species with creeping rhizomes. Type species, *Calamovilfa brevipilis*. Name from Greek *kalamos*, reed, and *Vilfa*, a genus of grasses. *Calamovilfa longifolia* is of some value for forage, but is rather coarse and woody; a variety of this and also *C. gigantea* are inland sand binders.

Rhizomes short and thick.

Panicle narrow, contracted..... 1. *C. CURTISSII*.

- Panicle subpyramidal, rather open..... 2. *C. BREVIPILIS*.
 Rhizomes extensively creeping.
 Lemma glabrous (except for the callus hairs)..... 3. *C. LONGIFOLIA*.
 Lemma villous on the back above the callus hairs..... 4. *C. GIGANTEA*.

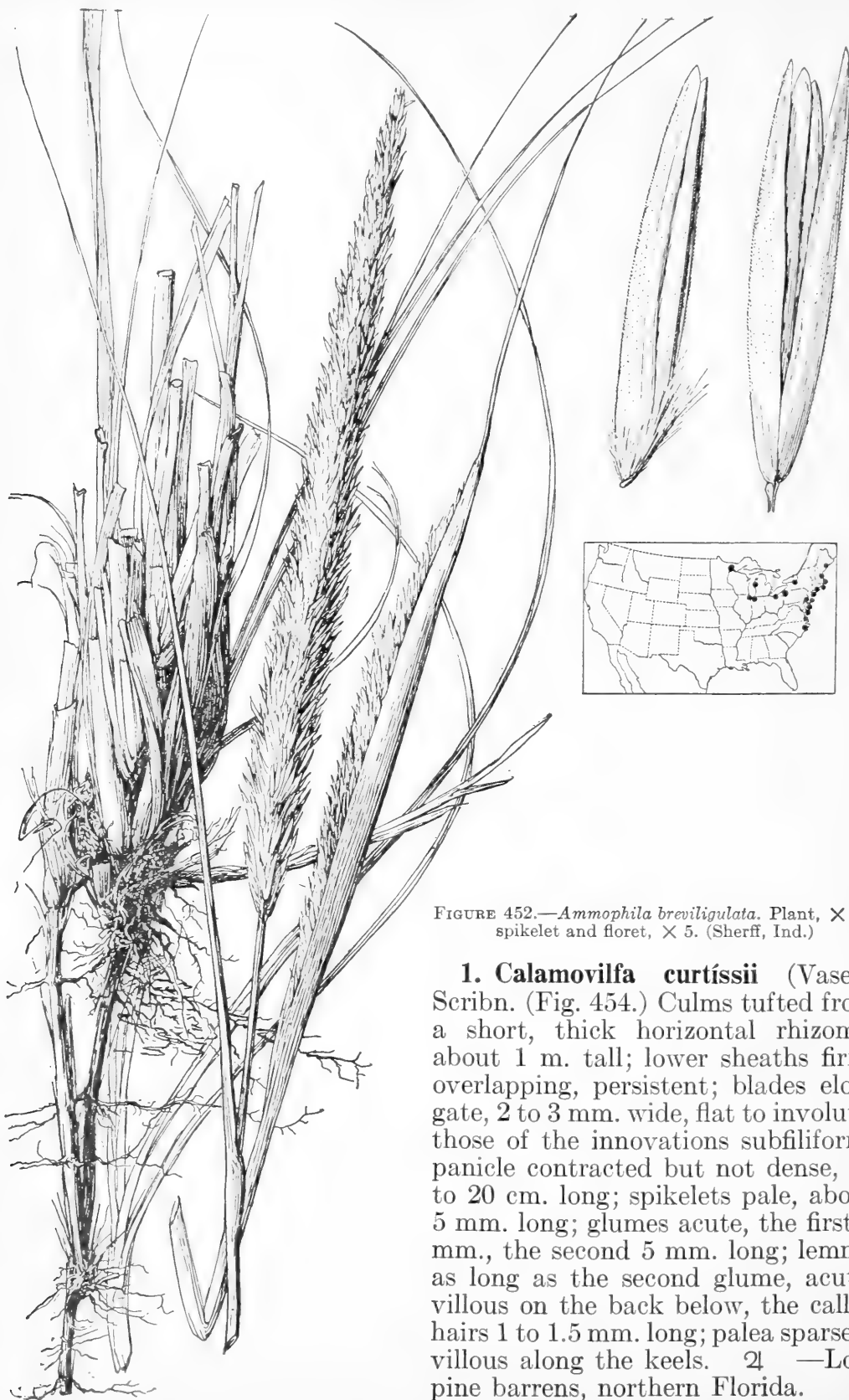


FIGURE 452.—*Ammophila breviligulata*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Sherff, Ind.)

1. *Calamovilfa curtissii* (Vasey)

Scribn. (Fig. 454.) Culms tufted from a short, thick horizontal rhizome, about 1 m. tall; lower sheaths firm, overlapping, persistent; blades elongate, 2 to 3 mm. wide, flat to involute, those of the innovations subfiliform; panicle contracted but not dense, 15 to 20 cm. long; spikelets pale, about 5 mm. long; glumes acute, the first 4 mm., the second 5 mm. long; lemma as long as the second glume, acute, villous on the back below, the callus hairs 1 to 1.5 mm. long; palea sparsely villous along the keels. 2 —Low pine barrens, northern Florida.

2. *Calamovilfa brevipilis* (Torr.)

Scribn. (Fig. 455.) Culms solitary or few, compressed, 60 to 120 cm. tall, the base as in *C. curtissii*; blades elongate, 2 to 3 mm. wide, flat to subinvolute; panicle subpyramidal, rather open, 10 to 25 cm. long, the branches ascending, flexuous, naked below; pedicels sparsely pilose at the summit; spikelets brownish, 5 to 6 mm. long; glumes acuminate, the first 2 to 2.5 mm. long, the second about 4 mm. long; lemma villous on the back below, the callus hairs 1.5 mm. long; palea exceeding the lemma, villous on the back. 2 —Marshes and river banks, New Jersey.

CALAMOVILFA BREVIPILIS var. *CÁLVIPES* Fernald. Very similar to the



FIGURE 454.—*Calamovilfa curtissii*. Plant, $\times \frac{1}{2}$; glumes and floret, $\times 5$. (Garber, Fla.)

species; panicles looser, more open; pedicels glabrous; spikelets 4 to 5 mm. long, the lemma and palea about equal. 2 —Sphagnous bog, Greensville County, Va.

CALAMOVILFA BREVIPILIS var. *HETERÓLEPIS* Fernald. Panicles somewhat narrower; pedicels with a few short hairs at summit; spikelets more crowded toward the ends of the branches, 5.5 to 6 mm. long, the palea slightly shorter than the lemma. 2 —Edge of swamps and moist savannas, Virginia to South Carolina.

3. *Calamovilfa longifolia* (Hook.)

Scribn. (Fig. 456.) Culms mostly solitary, 50 to 180 cm. tall, with strong scaly creeping rhizomes; sheaths usually more or less appressed-villous, especially near the summit; blades firm, elongate, flat or soon involute, 4 to 8 mm. wide near base, tapering to a long fine point; panicle 15 to 35 cm. long, rather narrow or contracted,



FIGURE 453.—*Ammophila arenaria*. Glumes, floret, and ligule, $\times 5$. (Heller 5670.)



FIGURE 455.—*Calamovilfa brevipilis*. Plant, $\times \frac{1}{2}$; glumes and floret, $\times 5$. (Brinton, N. J.)

the branches ascending or appressed, sometimes slightly spreading; spikelets pale, 6 to 7 mm. long; glumes acuminate, the first about 2 mm. shorter than the second; lemma somewhat shorter than the second glume, glabrous, the callus hairs copious, more than half as long as the lemma. ♀ —Sand hills and sandy prairies or open woods, Michigan to Alberta, south to Indiana, Colorado, and Idaho. *CALAMOVILFA LONGIFOLIA* var. *MAGNA* Scribn. and Merr. Panicle more open and spreading. ♀ —Sandy ridges and dunes along Lakes Huron and Michigan.

4. *Calamovilfa gigantéa* (Nutt.) Scribn. and Merr. (Fig. 457.) Culms robust, mostly solitary, usually 1.5 to 2 m. tall, as much as 6 mm. thick at base, with strong creeping rhizomes; sheaths glabrous; blades elongate, 5 to 10 mm. wide at base, tapering to a long involute tip; panicle open, as much as 60 cm. long, the branches rather stiffly spreading, as much as 25 cm. long; spikelets similar to those of *C. longifolia*, but somewhat larger; lemma and palea villous along the back; callus hairs copious, half as long as the lemma. ♀ —Sand dunes, Kansas to Utah, Texas, and Arizona.

70. *APÉRA* Adans.

(Included in *Agrostis* L. in Manual, ed. 1)

Spikelets 1-flowered, disarticulating above the glumes, the rachilla prolonged back of the palea as a naked bristle; glumes subequal, acuminate; lemma firm, subindurate at maturity, acute, bearing a long delicate straight awn just below the tip; palea nearly as long as the lemma, strongly 2-nerved. Annuals with flat blades and loose or narrow panicles. Type species, *Apera spica-venti* (L.) Beauv. Name from Greek *a*, not, and *peros*, maimed, apparently alluding to the long awn, this nearly wanting in *Calamagrostis calamagrostis* (L.) Karst. (*C. lanceolata* Roth), from which Adanson differentiated the genus.

- | | |
|---|----------------------------|
| Panicle open, the branches naked below..... | 1. <i>A. SPICA-VENTI</i> . |
| Panicle narrow, contracted, interrupted, the branches, or some of them floriferous from the base..... | 2. <i>A. INTERRUPTA</i> . |

| | |
|---|---|
| 1. <i>Apera spica-vénti</i> (L.) Beauv.
(Fig. 458.) Annual; culms branched at base, mostly 40 to 60 cm. tall; | ligule as much as 6 mm. long; blades flat, 1 to 3 mm. wide; panicle 10 to |
|---|---|



FIGURE 456.—*Calamovilfa longifolia*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Babcock, Ill.)



FIGURE 457.—*Calamovilfa gigantea*. Panicle, $\times \frac{1}{2}$; glumes and floret, $\times 5$. (White, Okla.)

20 cm. long, usually less than half as broad, the branches capillary, spreading, whorled, naked at base; spikelets 2 to 2.5 mm. long; glumes somewhat unequal, the first shorter and narrower; lemma about as long as the second glume, scaberulous, with a slender awn from below the apex, the awn about twice as long as the glumes; palea about as long as the lemma; rachilla less than 0.5 mm. long. ☉ —Introduced at a few points from Maine to Maryland;

Ohio; Missouri; Portland, Oreg.; Europe.

2. *Apera interrúpta* (L.) Beauv. (Fig. 459.) Similar to *A. spica-venti*; panicle narrower, more condensed, interrupted, the branches or some of them floriferous from the base; awn of lemma about 1 cm. long. ☉ — Introduced in Missouri (St. Louis), Washington (Spokane), Oregon (Portland), Idaho (Nezperce Forest), and British Columbia (Okanogan); Europe.

71. AGRÓSTIS L. BENTGRASS

Spikelets 1-flowered, disarticulating above the glumes, the rachilla usually not prolonged; glumes equal or nearly so, acute, acuminate, or sometimes awn-pointed, usually scabrous on the keel and sometimes on the back; lemma obtuse, usually shorter and thinner than the glumes, mostly 3-nerved, awnless or dorsally awned, often hairy on the callus; palea usually shorter than the lemma, 2-nerved in only a few species, usually small and nerveless or obsolete. Delicate to moderately tall annuals or usually perennials, with flat or sometimes involute, scabrous blades, and open to contracted panicles of small spikelets. Type species, *Agrostis stolonifera*. Name from Greek *agrostis*, a kind of grass, from *agros*, a field; the word agrostology is from the same root. The rachilla is regularly prolonged in a few species and in occasional spikelets of other species.

Most of the species are important forage plants, either under cultivation or in the mountain meadows of the Western States. The three important cultivated species are redtop, *Agrostis alba*, used for meadows, pastures, lawns, and sports turf, Colonial bent, *A. tenuis*, used for pastures, lawns, and sports turf, and creeping bent, *A. palustris*, used for lawns and golf greens. Velvet bent, *A. canina*, is sometimes used for putting greens. Recently forms of *A. palustris*, called Washington bent and Metropolitan bent, have come into use for lawns and especially for golf greens. They are propagated by the stolons. Fiorin is a name applied in England to *A. palustris*.

The native species abundant enough to be of importance as forage plants are *A. exarata*, throughout the western part of the United States, *A. oregonensis* in Oregon, and *A. variabilis* in alpine regions of the Northwest.

1a. Palea evident, 2-nerved, at least half as long as the lemma.



FIGURE 458.—*Apera spicaventi*. Plant, $\times \frac{1}{2}$; glumes and floret, $\times 5$. (Martindale, N. J.)

FIGURE 459.—*Apera interrupta*. Panicle, $\times \frac{1}{2}$; glumes and floret, $\times 5$. (Bonser 3, Wash.)

- 2a. Rachilla prolonged behind the palea as a minute bristle.
 Lemma pubescent..... 1. *A. AVENACEA*.
 Lemma glabrous.
 Spikelets 2 mm. long..... 2. *A. THURBERIANA*.
 Spikelets 3 mm. long..... 3. *A. AEQUIVALVIS*.
- 2b. Rachilla not prolonged.
 Glumes scabrous on the keel and on the back; panicle contracted, lobed, the short branches densely verticillate..... 4. *A. SEMIVERTICILLATA*.
 Glumes scabrous on the keel only; panicle open or, if contracted, not lobed nor with densely verticillate branches.
 Plants tufted; dwarf alpine species..... 10. *A. HUMILIS*.
 Plants with rhizomes or stolons; taller species of low and medium altitudes.
 Branches of panicle naked at base, the panicle open and delicate; ligule as much as 2 mm. long on culm leaves, less than 1 mm. on the innovations..... 9. *A. TENUIS*.
 Branches of panicle or some of them floriferous from base; ligule as much as 6 mm. long.
 Panicle contracted, the branches appressed; long stolons developed in isolated plants. Culms decumbent at base..... 6. *A. PALUSTRIS*.
 Panicle open, the branches ascending, no long stolons developed.
 Culms producing rather stout creeping leafy stolons..... 7. *A. NIGRA*.
 Culms decumbent at base; rhizomes wanting..... 5. *A. STOLONIFERA*.
 Culms erect; rhizomes developed..... 8. *A. ALBA*.
- 1b. Palea obsolete, or a minute nerveless scale (in *A. exarata* and *A. californica* as much as 0.5 mm. long or more).
 3a. Plants annual, lemma with a slender awn, geniculate or flexuous.
 Lemma awnless..... 11. *A. ROSSAE*.
 Lemma with a slender geniculate or flexuous awn.
 Awn flexuous, delicate; Southeastern States..... 12. *A. ELLIOTTIANA*.
 Awn geniculate; Pacific coast.
 Spikelets about 1.5 mm. long; lemma awned below the tip..... 13. *A. EXIGUA*.
 Spikelets at least 2.5 mm. long; lemma awned from the middle.
 Apex of lemma obscurely toothed or nearly entire; lemma 1.7 to 1.9 mm. long..... 16. *A. MICROPHYLLA*.
 Apex of lemma bearing 2 or 4 delicate awns.
 Lemma pilose; glumes 3.5 to 4 mm. long..... 15. *A. KENNEDYANA*.
 Lemma glabrous except on the callus; glumes 5 to 6 mm. long.
 Lemma relatively firm, scabrous, 3.2 to 3.5 mm. long; palea nearly $\frac{1}{3}$ as long as the lemma..... 17. *A. ARISTIGLUMIS*.
 Lemma thin, glabrous, 3 mm. long; palea obsolete..... 14. *A. HENDERSONI*.
- 3b. Plants perennial; lemma awned or awnless, the awn when present not much exerted.
 4a. Plants spreading by creeping rhizomes (those of *A. lepida* short).
 Hairs at base of lemma 1 to 2 mm. long..... 18. *A. HALLII*.
 Hairs at base of lemma minute or wanting.
 Rhizomes short; alpine tufted plants..... 19. *A. LEPIDA*.
 Rhizomes long and slender.
 Panicle spikelike..... 20. *A. PALLENS*.
 Panicle open..... 21. *A. DIEGOENSIS*.
- 4b. Plants without rhizomes, stolons sometimes developed.
 5a. Panicle narrow, contracted, at least some of the lower branches spikelet-bearing from the base.
 Culms slender, not more than 20 cm. tall, in dense tufts with numerous basal leaves; blades not more than 7 cm. long, mostly less, less than 2 mm. wide; panicles seldom more than 5 mm. wide.
 Culms spreading; panicles strict, greenish; lemma with a minute awn or the midnerve ending below the summit..... 22. *A. BLASDALEI*.
 Culms erect; panicle narrow but loose, purple; lemma awnless, the midnerve reaching the summit..... 23. *A. VARIABILIS*.
 Culms taller, stouter, not in tufts with dense basal foliage; blades or some of them at least 8 to 10 cm. long and 3 to 5 mm. wide, commonly much larger; glumes scabrous on the keel.
 Panicle from loose to dense; lemma acute, not toothed; palea minute.
 Panicle loose, the branches verticillate, not densely flowered at base; awn of lemma twisted, geniculate..... 25. *A. AMPLA*.
 Panicle dense to loose, the branches crowded and densely flowered at base; lemma awnless or (in vars. *pacifica* and *monolepis*) awned..... 24. *A. EXARATA*.

- Panicle dense and spikelike; lemma minutely 4-toothed; palea $\frac{1}{4}$ to $\frac{1}{3}$ as long as the lemma..... 26. *A. CALIFORNICA*.
- 5b. Panicle open, sometimes diffuse; branches very slender, scabrous, the lower branches not spikelet-bearing at the base.
- Lemma awned from near the base.
- Blades elongate, 3 to 5 mm. wide; panicle branches flexuous; spikelets about 3.5 mm. long..... 28. *A. HOWELLII*.
- Blades about 1 mm. wide or less; panicle branches straight; spikelets 2 to 2.5 mm. long..... 27. *A. HOOVERI*.
- Lemma awnless or awned from the middle or above.
- Panicle very diffuse, the capillary branches branching toward the end or (in *A. scabra* var. *geminata*) above the middle.
- Spikelets 1.5 to 1.7 mm. long, very densely clustered at the ends of the branchlets; lemma 1 to 1.2 mm. long, scarcely longer than the caryopsis; anthers about 0.2 mm. long..... 29. *A. HIEMALIS*.
- Spikelets 2 to 2.7 mm. long, loosely arranged at the ends of the branchlets; lemma 1.5 to 1.7 mm. long, distinctly longer than the caryopsis; anthers 0.4 to 0.5 mm. long..... 30. *A. SCABRA*.
- Panicle open but not diffuse, the branches branching at or below the middle.
- Lemma awnless (occasional plants with awned lemmas).
- Spikelets about 2 mm. long; plants of high altitudes, delicate, 10 to 30 cm. tall..... 31. *A. IDAHOENSIS*.
- Spikelets 2 to 3 mm. long; more robust plants of low and medium altitudes.
- Panicle rather lax, sometimes delicate and divaricately spreading; blades flat, as much as 6 mm. wide; eastern United States.
- Spikelets mostly 2.2 to 2.7 mm. long, not aggregate or but slightly so at the ends of the panicle branches..... 32. *A. PERENNANS*.
- Spikelets mostly 2.7 to 3.5 mm. long, aggregate towards the ends of the panicle branches..... 33. *A. ALTISSIMA*.
- Panicle rather stiff, the branches whorled and rather stiffly ascending; Pacific coast..... 34. *A. OREGONENSIS*.
- Lemma awned.
- Spikelets about 2 mm. long; introduced..... 35. *A. CANINA*.
- Spikelets 2.5 to 3 mm. long; native.
- Ligule 1 to 2 mm. long..... 36. *A. BOREALIS*.
- Ligule 5 to 8 mm. long..... 37. *A. LONGILIGULA*.



FIGURE 460. — *Agrostis avenacea*. Panicle, $\times \frac{1}{2}$; glumes and floret, $\times 10$. (Tracy and Earle 403, Tex.)

1. *Agrostis avenacea* Gmel. (Fig. 460.) Perennial; culms tufted, erect or decumbent at base, 20 to 60 cm. tall; sheaths smooth; ligule of culm leaves 3 to 5 mm. long; blades flat, scabrous, 1 to 2 mm. wide; panicle diffuse, 15 to 30 cm. long, the branches in distant whorls, capillary, reflexed at maturi-

ty, divided above the middle; glumes acuminate, 3 to 4 mm. long; lemma about half as long as the glumes, thin, pubescent, short-bearded on the callus, and bearing about the middle a slender geniculate and twisted awn exerted about the length of the glumes; palea nearly as long as the

lemma; rachilla slender, pilose, from half to as long as the lemma. 2 (A. retrofracta Willd.)—Introduced in central California (15 miles south of Stockton), Texas (Kent), and Ohio (Painesville); common in Hawaiian Islands and Polynesia.



FIGURE 461.—*Agrostis thurberiana*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Type.)



FIGURE 462.—*Agrostis aequivalvis*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Howell 1712, Alaska.)

2. *Agrostis thurberiána* Hitchc. THURBER BENT. (Fig. 461.) Culms slender, in small tufts, erect, 20 to 40 cm. tall; leaves somewhat crowded at base, the blades about 2 mm. wide; panicle rather narrow, lax, more or less drooping, 5 to 7 cm. long; spikelets green, pale, or purple, 2 mm. long; lemma nearly as long as the glumes, the palea about two-thirds as long; rachilla hairy, 0.3 mm. long. 2 —Bogs and moist places, at medium and upper altitudes, Colorado

to British Columbia and south in the Sierras to central California.

3. *Agrostis aequivalvis* (Trin.) Trin. (Fig. 462.) Similar to *A. thurberiana*; culms on the average taller, blades longer; panicle usually purple, 5 to 15 cm. long; spikelets about 3 to 4.5 mm. long; palea nearly as long as the lemma; rachilla minutely pubescent, one-fifth to half as long as the lemma. 2 —Wet meadows and bogs, Alaska, southward (rare) in the Cascade Mountains to Oregon.

4. *Agrostis semiverticillata* (Forsk.) C. Christ. WATER BENT. (Fig. 463.) Culms usually decumbent at base, sometimes with long creeping and rooting stolons; blades firm, mostly relatively short and broad, but in luxuriant specimens elongate; panicle contracted, 3 to 10 cm. long, densely flowered, lobed, with short verticillate branches, especially at base, the branches spikelet-bearing from the base; spikelets usually falling entire; glumes equal, narrowed to an obtuse tip, scabrous on back and keel, 2 mm. long; lemma 1 mm. long, awnless, truncate and toothed at apex; palea nearly as long as the lemma. 2 (*A. verticillata* Vill.)—Moist ground at low altitudes, especially along irrigation ditches (in irrigated regions), Texas to California, north to Utah and Washington; on ballast at some Atlantic ports. Introduced in America, south to Argentina; warmer parts of the Eastern Hemisphere.

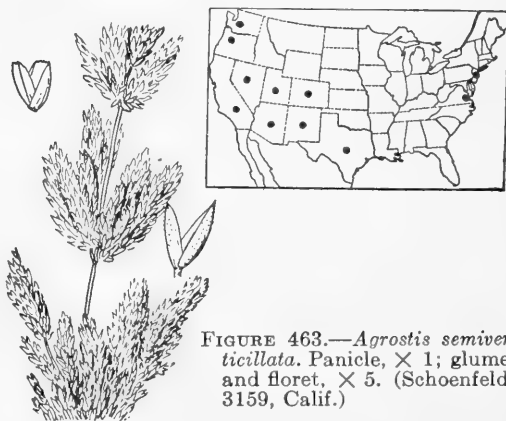


FIGURE 463.—*Agrostis semiverticillata*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Schoenfeldt 3159, Calif.)

5. *Agrostis stolonífera* L. (Fig. 464.) Culms ascending from a spread-

ing base, the decumbent portion rooting in wet soil, 20 to 50 cm. tall; ligule as much as 6 mm. long; blades flat, mostly 1 to 3 mm. wide; panicle oblong, 5 to 15 cm. long, pale or purple, somewhat open, the branches or some of them spikelet-bearing from near the base; spikelets 2 to 2.5 mm. long; glumes acute, glabrous except the scabrous keel; lemma shorter than the glumes, awnless or rarely awned from the back; palea usually half to two-thirds as long as the lemma. 2l —Moist grassy places, Newfoundland to Alaska, south to Virginia (adventive in South Carolina) in the East and to Washington in the West; northern Europe. This species appears to be native in northern North America.

6. *Agrostis palustris* Huds. CREEPING BENT. (Fig. 465.) Differing from *A. stolonifera* chiefly in the long stolons, the narrow stiff appressed blades, and the condensed (sometimes somewhat open) panicle. 2l (*A. maritima* Lam.)—Marshes along the

interior of southern Canada and northeastern United States to Virginia and Wisconsin, and occasion-



FIGURE 465.—*Agrostis palustris*. Plant, $\times 1$; glumes and floret, $\times 5$. (Hitchcock 11713, Wash.)

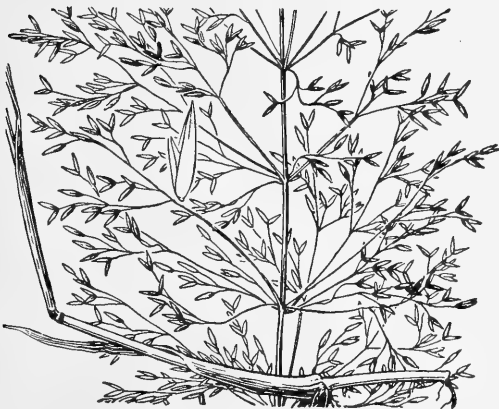


FIGURE 464.—*Agrostis stolonifera*. Panicle, $\times 1$; floret, $\times 5$. (Hitchcock 23899, Newfoundland.)

coast, from Newfoundland to Virginia; British Columbia to northern California; sometimes occupying extensive areas, as at Coos Bay, Oreg.; introduced at various places in the

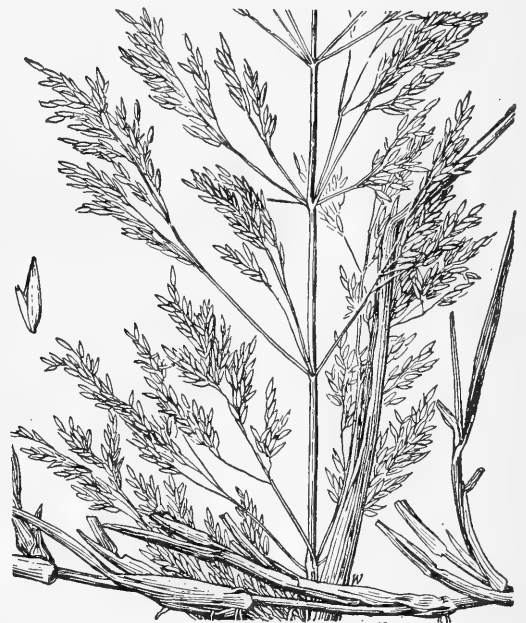


FIGURE 466.—*Agrostis nigra*. Plant, $\times 1$; floret, $\times 5$. (Moore 47, cult. Mo. Bot. Gard.)

ally southward, Texas to Arizona, especially along ditches; Idaho and Washington to Colorado and California; Eurasia. Forms of this species, known as seaside, Coos Bay, and Cocoos bents (propagated by seed), and Metropolitan and Washington



FIGURE 467.—*Agrostis alba*. Plant, $\times \frac{1}{2}$; 2 spikelets and floret, $\times 5$. (Chase 5191, Mont.)

bents (propagated by stolons and formerly called carpet bent), are used for lawns and extensively for putting greens.

7. *Agrostis nígra* With. BLACK BENT. (Fig. 466.) Culms long-decumbent at base, also with rather stout leafy stolons, the fertile branches ascending or erect, 20 to 30 cm. tall; ligule as in *A. alba*; panicle brownish, open as in *A. alba*, but on the average more condensed. along the branches, the base usually partly included. ♀ —Sometimes found mixed with "South German" bent (creeping bent), hence may be a constituent of lawns grown from imported seed; Europe.

8. *Agrostis álba* L. REDTOP. (Fig. 467.) Differing from *A. stolonifera* in its usually erect more robust culms, sometimes as much as 1 to 1.5 m. tall, the base erect or decumbent, with strong creeping rhizomes; blades flat, 5 to 10 mm. wide; panicle pyramidal-oblong, reddish, as much as 20 cm. long, the branches spreading in anthesis, sometimes contracting later; lemmas rarely awned ♀ (*A. gigantea* Roth.)—This is the common redtop cultivated for meadows, pastures, and lawns, extensively escaped in all the cooler parts of the United States; Eurasia. This form appears not to be native in America. Plants growing without cultivation often have pale panicles and may tend to

take on the aspect of *A. stolonifera*. This and the two preceding are closely allied and appear to intergrade. The name *A. palustris* has been erroneously applied to this species.

9. *Agrostis ténuis* Sibth. COLONIAL BENT. (Fig. 468, A.) Culms slender, erect, tufted, usually 20 to 40 cm. tall, with short stolons but no creeping rhizomes; ligule short, less than 1 mm. or on the culm as much as 2 mm. long; blades mostly 5 to 10 cm. long, 1 to 3 mm. wide; panicle mostly 5 to 10 cm. long, open, delicate, the slender branches naked below, the spikelets not crowded. ♀ (*A. vulgaris* With.)—Cultivated for pastures and lawns in the northeastern United States; escaped and well established throughout those regions; Newfoundland south to North Carolina, West Virginia, and Michigan; British Columbia to Montana and California; Europe. This species appears not to be native in America; it has been referred to *A. capillaris* L., a distinct species of Europe. In older works this has been called Rhode Island bent. Forms of this species are sometimes called Prince Edward Island, New Zealand, Rhode Island Colonial, Astoria, and Colonial bent. Highland bent is an aberrant form which may be a distinct species.

AGROSTIS TENUIS var. ARISTÁTA (Parnell) Druce. (Fig. 468, B.) Differing from *A. tenuis* in having lemma awned from near the base, the awn usually geniculate and exceeding the glumes. ♀ —Fields and open woods, Nova Scotia and Quebec to North Carolina; Alaska to Vancouver Island; northern California; Europe. This form appears to be native, at least in the more northerly part of its range.

10. *Agrostis húmilis* Vasey. (Fig. 469.) Culms low, tufted, mostly not more than 15 cm. tall; leaves mostly basal, the blades flat or folded, usually not more than 1 mm. wide; panicle narrow, purple, 1 to 3 cm. long, the branches appressed to somewhat spreading; spikelets about 2

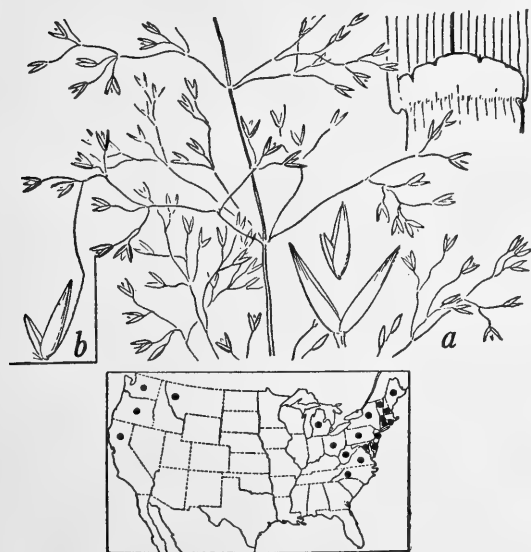


FIGURE 468.—A, *Agrostis ténuis*. Panicle, $\times 1$; glumes, floret, and ligule, $\times 5$. (Waghorne, Newfoundland.) B, Var. *aristata*. Floret, $\times 5$. (Gayle 786, Maine.)



FIGURE 469.—*Agrostis humilis*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Type.)

mm. long; lemma nearly as long as the glumes, awnless; palea about two-thirds as long as lemma. ☉ —Bogs and alpine meadows at high altitudes, Wyoming and Colorado to Washington, Oregon, and Nevada.



FIGURE 470.—*Agrostis rossae*. Panicle, $\times 1$; glumes and floret, $\times 5$. (V. H. Chase 5740, Yellowstone Natl. Park, Wyo.)

11. *Agrostis róssae* Vasey. (Fig. 470.) Annual, erect, leafy and branching at base, 10 to 19 cm. tall; sheaths rather loose; blades flat, 1 to 2.5 cm. long, 1 to 2 mm. wide; panicle 3.5 to 6 cm. long, usually contracted, the capillary scabrous purplish branches in relatively distant fascicles, narrowly ascending, naked at base; spikelets 2 to 2.5 mm. long; glumes acuminate; lemma 1.5 to 1.6 mm. long, minutely toothed, awnless; palea very minute. ☉ —Alkali soil near hot springs, Upper Geyser Basin and

along Fire Hole River, Yellowstone Park, Wyo.

12. *Agrostis elliottiana* Schult. (Fig. 471.) Annual; culms slender, erect or decumbent at base, 10 to 40 cm. tall; blades flat, about 1 mm. wide; panicle finally diffuse, about half the entire height of the plant, the branches capillary, fascicled, the spikelets toward the ends of the branchlets, the whole panicle breaking away at maturity; spikelets 1.5 to 2 mm. long; glumes acute; lemma



FIGURE 471.—*Agrostis elliottiana*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Johnson, Miss.)

1 to 1.5 mm. long, minutely toothed, awned below the tip, the awn very slender, flexuous, delicately short-pilose, 5 to 10 mm. long, sometimes falling at maturity; palea wanting. ☉ —Fields, waste places, and open ground, Maryland to Kansas, south to Georgia and eastern Texas; introduced in Maine and Massachusetts; Yucatan.



FIGURE 472.—*Agrostis exigua*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Type.)

13. *Agrostis exigua* Thurb. (Fig. 472.) Annual; culms delicate, 3 to 10 cm. tall, branching from the base; blades 5 to 20 mm. long, subinvolute, scabrous; panicle half the length of the plant, finally open; glumes 1.5 mm. long, scaberulous; lemma equaling the glumes, scaberulous toward the 2-toothed apex, bearing below the tip a delicate bent awn 4 times as long; palea wanting. ☉ —Foot-hills and rocky plains, upper Sacramento Valley, and muddy pond border, Howell Mountain, Napa County, Calif.



FIGURE 473.—*Agrostis hendersonii*. Plant, $\times 1$; glumes and 2 views of floret, $\times 5$. (Type.)

14. *Agrostis hendersonii* Hitchc. (Fig. 473.) Annual; culms about 10

cm. tall; ligule 2 to 3 mm. long; blades flat or loosely involute, 1 to 3 cm. long, about 1 mm. wide; ligule delicate, about 2 mm. long; panicle condensed, about 2.5 cm. long, purplish; spikelets short-pedi-



FIGURE 474.—*Agrostis kennedyana*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Type collection.)

FIGURE 475.—*Agrostis microphylla*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Bolander 1512, Calif.)

celed, 5 to 6 mm. long; glumes subequal, setaceous-tipped; lemma about 3 mm. long, finely 2-toothed, the delicate awns of the teeth readily breaking off, awned from the middle, the awn about 1 cm. long, geniculate, the callus pubescent; palea obsolete. ☉ —Wet ground, known only from Sams Valley, near Gold Hill, Jackson County, Oreg., and Shasta County, Calif.

15. *Agrostis kennedyana* Beetle. (Fig. 474.) Annual; culms very slender, 15 to 23 cm. tall; ligule about 2 mm. long; blades flat or loosely involute, 2 to 4 cm. long, 1 to 1.5 mm. wide, or the basal blades slightly

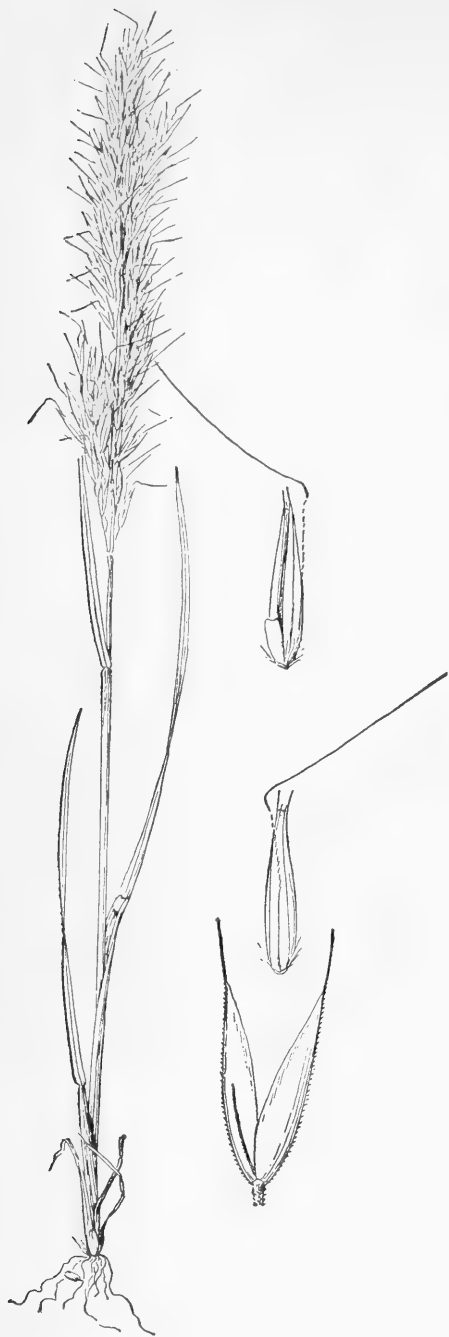


FIGURE 476.—*Agrostis aristigluma*. Plant, $\times \frac{1}{2}$; glumes and two views of floret, $\times 5$. (Type.)

longer; panicle spikelike, 2 to 5 cm. long, pale; spikelets short-pediceled; glumes narrow, acuminate, the first 3.5 to 4 mm., the second 3 to 3.2 mm. long; lemma delicate, about 1.7 mm. long, awned from about the middle, the delicate awn about 5 mm. long, geniculate, the lemma loosely pilose except at the 2-toothed summit, the teeth bearing delicate awns

about 1 mm. long; palea obsolete.

⊙ —Known only from San Diego County, Calif.

16. *Agrostis microphylla* Steud. (Fig. 475.) Annual; culms branching at base, slender, erect or ascending, 8 to 40 cm. tall, commonly short and tall culms in the same tuft; blades 2 to 15 cm. long, rarely longer, 1.5 to 3 mm. wide, scabrous; panicle mostly 2 to 8 cm. long (exceptionally less or to 10 cm.), narrow, dense, often lobed; glumes subequal, 3 to 4.4 mm. long, acuminate to awn-tipped; lemma 1.7 to 1.9 mm. long, minutely toothed, awned from about the middle, the awn geniculate, 3.5 to 6 mm. long, rarely longer; palea wanting. ⊙ —Moist open ground, Vancouver Island, Oregon, California, and Baja California. Variable, occasionally small and delicate; glumes rarely only 2 to 2.5 mm. long. A short, densely tufted form with rather thick panicle has been differentiated as *A. inflata* Scribn. The type, from Vancouver Island, is a young plant, the panicles partly included in the slightly inflated upper sheaths. *A. MICROPHYLLA* var. *MAJOR* Vasey is a taller form, 40 to 55 cm. tall, the pale panicles to 15 cm. long; glumes 2.5 to 3 mm. long; lemma 1.6 to 1.7 mm. long. Only known from Humboldt Mountains, Nev.

17. *Agrostis aristiglumis* Swallen. (Fig. 476.) Annual; culms sparingly branching at base, erect, 5 to 15 cm. tall; ligule 2 to 2.5 mm. long, decurrent; blades flat, 2 to 15 cm. long, rarely longer, 1.5 to 3 mm. wide; panicle mostly 3 to 6 cm. long, 5 to 8 mm. wide, dense; glumes 5 to 6 mm. long, attenuate into an awn 1 to 2 mm. long, the first glume 1-nerved, the second 3-nerved; lemma 3.2 to 3.5 mm. long, relatively firm, scabrous, 5-nerved, awned from the back, the awn geniculate, 6 to 7 mm. long, the lateral nerves excurrent as delicate awns, the inner pair very minute; palea nearly one-third as long as the lemma, nerveless. ⊙ —Only known from a "slope of loose

gravelly soil on an outcrop of diatomaceous shale of the Monterey series," west of Mount Vision, Point Reyes Peninsula, Marin County, Calif.

18. *Agrostis hallii* Vasey. (Fig. 477.) Culms erect, 60 to 90 cm. tall, with creeping rhizomes; ligule usually conspicuous, 2 to 7 mm. long; blades flat, 2 to 5 mm. wide; panicle 10 to 15 cm. long, narrow but loose, the branches verticillate; glumes about 4 mm. long; lemma awnless, 3 mm. long, with a tuft of hairs at base about half as long; palea obsolete. ♀ — Mostly in woods near the coast from Oregon to Santa Barbara, Calif. *AGROSTIS HALLII* var. *PRINGLEI* (Scribn.) Hitchc. Branching, foliage stramineous; blades narrow, usually involute; panicle narrow, compact. ♀ — Near the coast, in sand, Mendocino County, Calif.



FIGURE 477.—*Agrostis hallii*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Bioletti 110, Calif.)

19. *Agrostis lepida* Hitchc. (Fig. 478.) Culms tufted, 30 to 40 cm. tall, erect, with numerous short rhizomes; ligule, at least on the innovations, as much as 4 mm. long; leaves mostly basal, the blades firm, erect, flat or folded, the upper culm leaf below the middle of the culm, the blade 3 cm. long or less; panicle purple, 10 to 15 cm. long, the branches verticillate,



FIGURE 478.—*Agrostis lepida*. Plant, $\times \frac{1}{2}$; glumes and floret, $\times 5$. (Type.)

becoming divaricately spreading, the lowermost 2 to 5 cm. long; glumes 3 mm. long, smooth or nearly so; lemma 2 mm. long; palea obsolete. ♀ — Meadows and open woods, Sequoia National Park and San Bernardino Mountains, Calif., at upper altitudes.

20. *Agrostis pallens* Trin. DUNE BENT. (Fig. 479.) Culms erect, 20 to 40 cm. tall, with creeping rhizomes; ligule rather firm, 2 to 3 mm. long; blades flat or somewhat involute, 1 to 4 mm. wide; panicle contracted, almost spikelike, 5 to 10 cm. long; glumes 2.5 to 3 mm. long; lemma a little shorter than the glumes, awnless; palea obsolete. ♀ — Sand dunes along the coast, Washington to central California.



FIGURE 479.—*Agrostis pallens*. Plant, $\times 1$; glumes and floret, $\times 5$. (Howell, Oreg.)

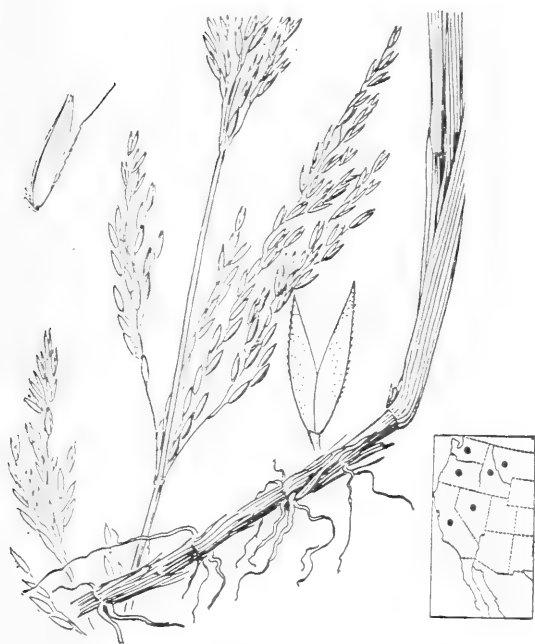


FIGURE 480.—*Agrostis diegoensis*. Plant, $\times 1$; glumes and floret, $\times 5$. (Orcutt, Calif.)

21. *Agrostis diegoensis* Vasey.
THINGRASS. (Fig. 480.) Culms erect, as much as 1 m. tall with creeping rhizomes; blades flat, lax, 2 to 6 mm. wide; panicle narrow, open, 10 to 15 cm. long, the branches ascending, rather stiff, some of them naked below; spikelets about as in *A. pallens*, awned or awnless. ♀ —Meadows and open woods at low and medium altitudes, Montana and British Columbia to southern California and Nevada.

22. *Agrostis blasdalei* Hitchc. (Fig. 481.) Culms 10 to 15 cm. tall, densely tufted; blades narrow or filiform, rigid, involute, 2 to 4 cm. long; panicle strict, narrow, almost spikelike, 2 to 3 cm. long, the short branches closely appressed; spikelets 2.5 to 3 mm. long; lemma about 1.8 mm. long, awnless or with a very short awn just above the middle; palea about 0.3 mm. long, nerveless. ♀ —Cliffs and dunes, Mendocino and Marin Counties, Calif. Previously referred to *A. breviculmis* Hitchc. of Peru.



FIGURE 481.—*Agrostis blasdalei*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Type.)

23. *Agrostis variabilis* Rydb.
MOUNTAIN BENT. (Fig. 482.) Culms 10 to 25 cm. tall, densely tufted; blades flat, mostly not more than 1 mm. wide; panicle, 2 to 6 cm. long, the branches ascending; spikelets pur-

ple, about 2.5 mm. long; lemma 1.5 mm. long, awnless; palea minute. 2 —Rocky creeks and mountain slopes at high altitudes; British Columbia and Alberta to Colorado and California. Included in *A. rossae* Vasey in Manual, ed. 1.



FIGURE 482.—*Agrostis variabilis*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Hitchcock 23178, Wyo.)

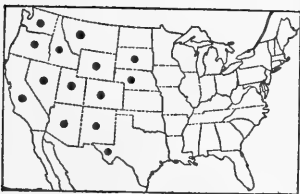


FIGURE 483.—*Agrostis exarata*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Davy 4357, Calif.)

24. *Agrostis exarata* Trin. SPIKE BENT. (Fig. 483.) Culms 20 to 120 cm. tall, slender to relatively stout, mostly tufted; sheaths smooth to somewhat scabrous; ligule to 6 mm.

long; blades flat, 2 to 10 mm. wide, usually scabrous; panicle narrow, from somewhat open to dense and interrupted, 5 to 30 cm. long; glumes subequal, 2.5 to 4 mm. long, acuminate to awn-tipped, scabrous on the keel, nearly smooth to scabrous on the back; lemma 1.7 to 2 mm. long, the midnerve ending above the middle or excurrent as a prickle or short awn, sometimes the nearly straight awn exceeding the glumes; palea minute. 2 —Moist open ground, at low and medium altitudes, South Dakota and Nebraska to Alberta and Alaska, south to Texas, California, and Mexico. Common and extremely variable, ranging from slender plants with narrow blades and few-flowered panicles (*A. scouleri* Trin.) to robust plants a meter or more tall, with dense panicles as much as 30 cm. long (*A. grandis* Trin.). The specimens in the Trinius Herbarium from Unalaska (type) and Sitka, with culms 25 to 60 cm. tall and narrow but not dense panicles, the lemmas awnless, represent about the center of the range of variation. Awnless and awned spikelets are found in the same panicle.

AGROSTIS EXARATA var. **PACÍFICA** Vasey. Lemma with a straight or weakly geniculate awn exceeding the glumes; habit of the plant, height, and foliage as in the species, the variations similar. 2 —Frequent from Vancouver Island and Washington to California, rare elsewhere: Canada, the Aleutians, Nebraska, Idaho, Arizona.

AGROSTIS EXARATA var. **MONOLÉPIS** (Torr.) Hitchc. Panicle narrow, dense, often interrupted; glumes mostly awn-tipped; awn of lemma exceeding the glumes 1.5 to 2 mm. 2 —Washington to California.

25. *Agrostis ampla* Hitchc. (Fig. 484.) Resembling *A. exarata* var. *pacifica*, the panicle looser, the branches verticillate, some of them 5 to 9 cm. long, the spikelets less crowded at the base; glumes 3.5 to 4.5 mm. (the first exceeding the second), acuminate to awn-tipped; lem-

ma about 2.5 mm. long, awned from about the middle, the awn twisted, geniculate; anthers 0.8 to 1.8 mm. long. 21 —Moist or wet places, Pacific slope, Oregon and California; infrequent.



FIGURE 484.—*Agrostis ampla*. Spikelet, and two views of floret, $\times 5$. (Type.)



FIGURE 485.—*Agrostis californica*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Anderson, Calif.)

26. *Agrostis californica* Trin. (Fig. 485.) Culms tufted, usually rather stout, erect or somewhat spreading at base, 15 to 60 cm. tall; sheaths sometimes slightly scabrous; ligule truncate, usually shorter than in *A. exarata*, puberulent; blades flat, firm, strongly nerved on the upper surface, usually not more than 10 cm. long, those of the culm comparatively broad and short, often 3 to 5 cm. long and 3 to 5 mm. wide, rarely as much as 10 mm. wide; panicle dense, spike-like, sometimes slightly interrupted, mostly 2 to 10 cm. long and 5 to 15 mm. wide; spikelets about 3 mm. long; glumes acute or acuminate, prominently scabrous on the keel and strongly scabrous on the sides; lemma a little shorter than the glumes, awnless or with a straight awn from minute to somewhat exceeding the glumes; palea one-fourth to one-third as long as the lemma. 21 (*A. densiflora* Vasey.)—Sandy soil and cliffs near the sea, Mendocino County to Santa Cruz, Calif. This species has been confused with *A. exarata* and

with *A. glomerata* (Presl) Kunth of Peru.

27. *Agrostis hooveri* Swallen. (Fig. 486.) Culms densely tufted, very slender, erect, 55 to 75 cm. tall; ligule 3 to 3.5 mm. long, lacerate, decurrent; blades lax, mostly 10 to 15 cm. long, not or scarcely more than 1 mm. wide; panicle 7 to 17 cm. long, loose, the branches ascending; spikelets slightly purplish, 2 to 2.5 mm. long, the second glume slightly shorter than the first; lemma 2 mm. long, minutely erose, 5-nerved, scaberulous, bearing from near the base a bent awn slightly exceeding the glumes; palea obsolete. 21 —Dry, mostly sandy open woodland, San Luis Obispo and Santa Barbara Counties, Calif.



FIGURE 486.—*Agrostis hooveri*. Panicle $\times 1$; glumes and floret, $\times 5$. (Type.)

28. *Agrostis howellii* Scribn. (Fig. 487.) Culms erect or decumbent at base, 40 to 60 cm. tall; ligule 3 to 4 mm. long, lacerate; blades lax, as much as 30 cm. long, 3 to 5 mm. wide; panicle loose and open, 10 to 30 cm. long, the branches flexuous; spikelets pale, clustered toward the ends of the branches; glumes acuminate, rather narrow and firm, somewhat scabrous on the keel, the first about 3.5 mm. long, the second a little shorter; lemma acute, 2.5 mm. long, 4-toothed, faintly 3- to 5-nerved, bearing from



FIGURE 487.—*Agrostis howellii*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Type.)

near the base an exserted bent awn about 6 mm. long; palea obsolete. 2 —Known only from Oregon (Multnomah and Hood River Counties).

29. *Agrostis hiemalis* (Walt.) B. S. P. (Fig. 488.) Culms mostly 30 to 40 cm. tall, erect in small tufts, glabrous; blades crowded toward the base in a dense cluster, 3 to 5 cm. long, less than 1 mm. wide, flat or subfiliform; panicles fragile, the slender filiform branches in rather distant whorls, widely spreading or drooping, unbranched below the middle, spikelet-bearing only at the ends of the branchlets; spikelets 1.5 to 1.7 mm. long, clustered, short-pedicel, appressed; glumes subequal, acute, scabrous on the keels; lemma 1 to 1.2 mm. long, the callus glabrous; anthers 0.2 mm. long. 2 —Open ground, fields, and waste places, Massachusetts to Florida, west to Wisconsin, Kansas, Oklahoma, and Texas.

30. *Agrostis scabra* Willd. (Fig. 489.) Culms 30 to 85 cm., rarely to 100 cm., tall, erect in small dense tufts; sheaths shorter than the internodes, glabrous; ligule hyaline, 2 to 5 mm. long; blades flat, 8 to 20 cm. long, 1 to 3 mm. wide, scabrous, the basal ones often subfiliform; panicles 15 to 25 cm. long, rarely longer, the

brittle scabrous branches in rather distant verticils, ascending or spreading, sometimes drooping, branching above the middle; spikelets 2 to 2.7 mm. long, loosely arranged at the ends of the branchlets; glumes unequal, acuminate, scabrous on the keels; lemma 1.5 to 1.7 mm. long, distinctly longer than the caryopsis, the callus sparsely pilose; anthers 0.4 to 0.5 mm. long. 2 —Mountain meadows, fields, and open woods, Newfoundland and Alaska, south to Florida, Texas, and California; probably introduced in the Southern States. (Included in *A. hiemalis* in Manual, ed. 1.)

AGROSTIS SCABRA var. **GEMINATA** (Trin.) Swallen. Branches of panicle short and divaricate; lemma awned or awnless. The type specimen, from Alaska, is awned; a large number of specimens over a wide range agree in other respects, but are awnless. 2 —At high latitudes and altitudes, Newfoundland to Alaska, south to New Hampshire, North Dakota, Colorado, and California.

31. *Agrostis idahoensis* Nash. **IDAHO REDTOP.** (Fig. 490.) Culms slender, tufted, 10 to 30 cm. tall; leaves mostly basal, the blades narrow; panicle loosely spreading, 5 to 10 cm. long, the branches capillary,

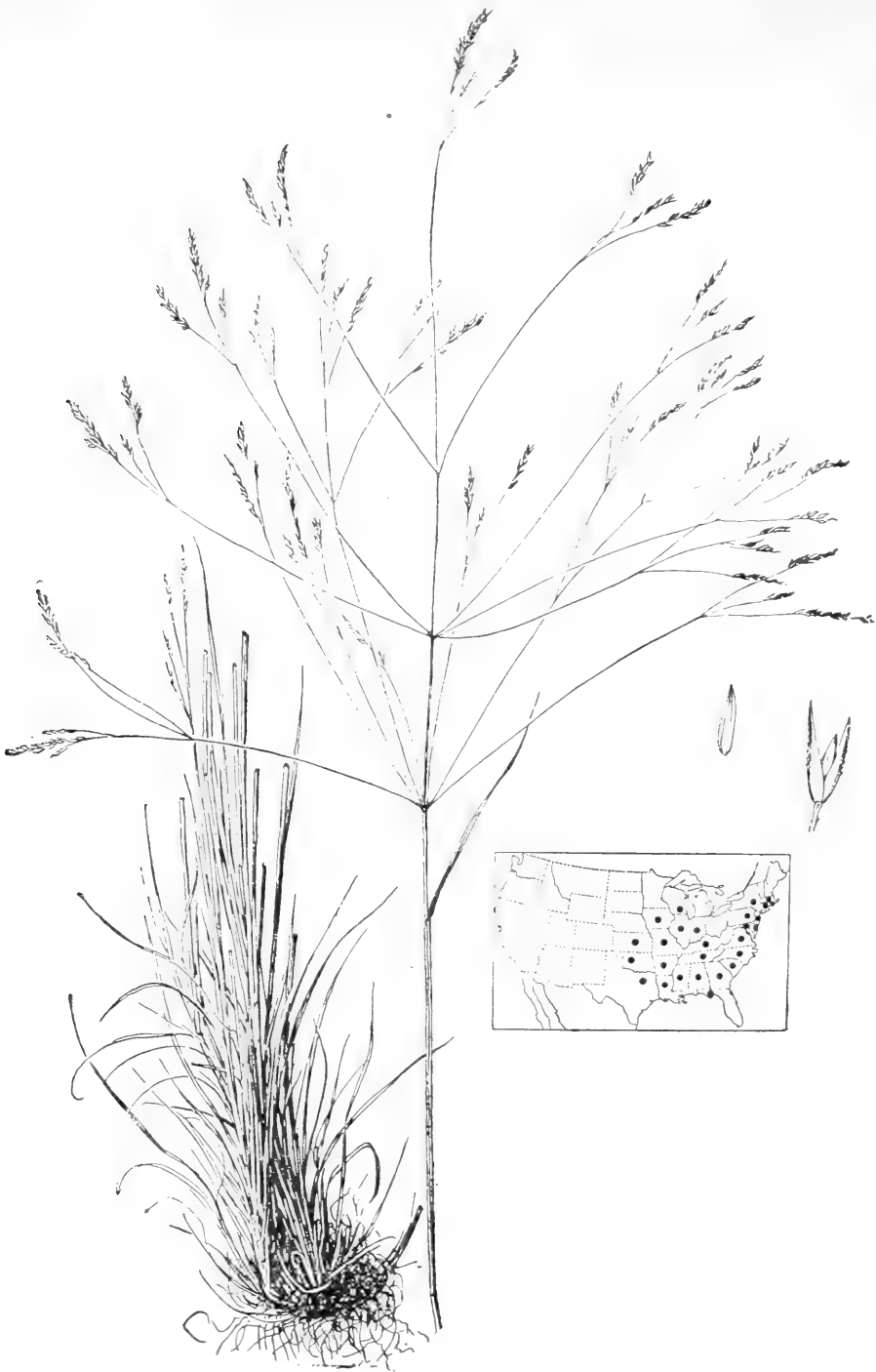


FIGURE 488.—*Agrostis hiemalis*. Plant, $\times \frac{1}{2}$; glumes and floret, $\times 5$. (Deam 6514, Ind.)

flexuous, minutely scabrous; spikelets 1.5 to 2.5 mm. long; lemma about 1.3 mm. long, awnless; palea minute. 21 —Mountain meadows, at medium and high altitudes, western Montana to Washington, south to New Mexico, Arizona, and the high mountains of California; Fairbanks, Alaska. Differs from *A. scabra* in the

smaller spikelets and in the narrower panicle with shorter flexuous branches.

32. *Agrostis perénnans* (Walt.) Tuckerm. AUTUMN BENT. (Fig. 491, A.) Culms erect to somewhat decumbent at base, varying from weak and lax to relatively stout, 30 to 100 cm. tall, often with lax leafy shoots at base; leaves rather numerous, the



FIGURE 489.—*Agrostis scabra*. Panicle, $\times 1$; spikelet and floret, $\times 10$. (Barkley and Rose 1881, Mont.)

blades from lax to stiffly upright, corresponding to the culms, 10 to 20 cm. long, 1 to 6 mm. wide; panicle pale to tawny, open, oblong, the branches verticillate, mostly lax, ascending, branching about the middle; spikelets 2 to 3.2, mostly 2.2 to 2.7 mm. long, the pedicels spreading, but the spikelets sometimes somewhat aggregate towards the ends of the branchlets; glumes acute or acuminate, the first slightly longer; lemma 1.5 to 2 mm. long, rarely awned (*A. perennans* forma *chaetophora* Fernald); palea obsolete or nearly so. 21 — Open ground, old fields, open woods, in rather dry soil from sea level to mountain tops, flowering in late summer or autumn, Quebec to Minnesota, south to Florida and eastern Texas; Mexico. Extremely variable, in dry open ground erect and rather stout; in shady places weak, with lax pale panicle and divaricate branch-

lets and spikelets 2 mm. long (*A. perennans* var. *aestivalis* Vasey). Intergrades with the following, the intermediate specimens (*A. scribneriana* Nash) rather numerous in the Eastern States.

33. *Agrostis altissima* (Walt.) Tuckerm. (Fig. 491, *B.*) Culms mostly stouter than in the preceding, erect or ascending; panicle branches usually ascending, the spikelets more or less aggregate toward the ends; spikelets 2.3 to 3.7, mostly 2.7 to 3.5 mm. long. 21 — Mostly in marshy ground, pine barren bogs, and wooded swamps, coastal plain, New Jersey and Maryland to Alabama and Mississippi.

34. *Agrostis oregonensis* Vasey. OREGON REDTOP. (Fig. 492.) Culms 60 to 90 cm. tall; blades 2 to 4 mm. wide; panicle oblong, 10 to 30 cm. long, open, the branches verticillate, rather stiff and ascending, numerous



in the lower whorls, the longer 5 to 10 cm. long, branching above the middle; glumes 2.5 to 3 mm. long; lemma 1.5 mm. long, awnless; palea about 0.5 mm. long. 2 —Marshes, bogs, and wet meadows, Montana to British Columbia, south to Wyoming and California.

35. *Agrostis canina* L. VELVET BENT. (Fig. 493.) Culms tufted, 30 to 50 cm. tall; blades mostly short and narrow, those of the culm 3 to 6 cm. long, usually not more than 2 mm. wide; panicle loose and spreading, mostly 5 to 10 cm. long; glumes equal, acute, 2 mm. long, the lower minutely scabrous on the keel; lemma a little shorter than the glumes, awned about the middle, the awn exserted, bent; callus minutely hairy; palea minute. 2 —Meadows and open ground, Newfoundland to Quebec, south to Delaware, West Virginia, Tennessee, and Michigan; pos-

FIGURE 490.—*Agrostis idahoensis*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Chase 5040, Idaho.)

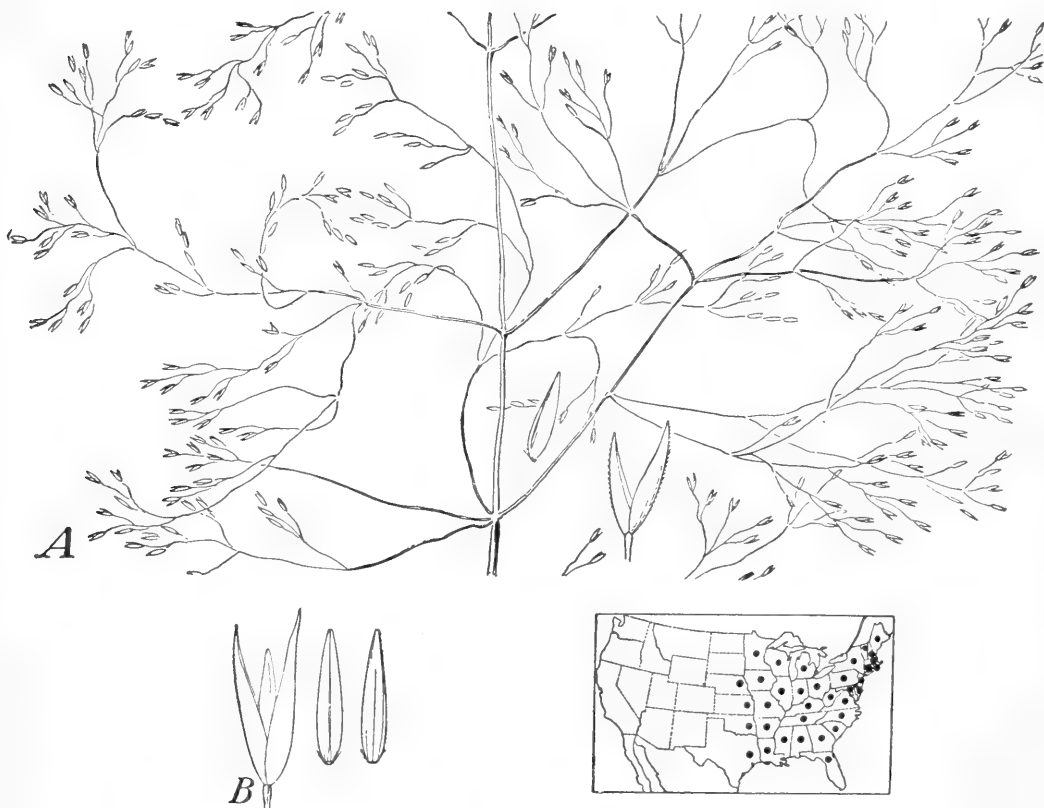


FIGURE 491.—A, *Agrostis perennans*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Millsbaugh 53, W. Va.) B, *A. altissima*. Glumes and two views of floret, $\times 5$. (A. Gray, N. J., in Trinius Herb.)

sibly native northward but introduced in the United States; Europe. Sometimes cultivated for putting greens.



FIGURE 492.—*Agrostis oregonensis*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Hitchcock 23524, Oreg.)



FIGURE 493.—*Agrostis canina*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Commons 99, Del.)

36. *Agrostis borealis* Hartm. (Fig. 494.) Culms tufted, 20 to 40 cm. tall, or, in alpine or high northern plants, dwarf; leaves mostly basal, the blades 5 to 10 cm. long, 1 to 3 mm. wide; panicle pyramidal, 5 to 15 cm. long, the lower branches whorled and spreading; glumes 2.5 to 3 mm. long, acute; lemma a little shorter than the glumes, awned, the awn usually bent and exserted; palea obsolete or nearly so. 2 (*A. bakeri* Rydb., lemma with a straight awn or awnless.)—Rocky slopes and moist banks at high latitudes and altitudes,



FIGURE 494.—*Agrostis borealis*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Faxon 99, N. H.)

Newfoundland and Greenland to Alaska, south to the high mountains of New England and New York; West Virginia; summit of Roan Mountain, N. C.; Alberta and Washington to Wyoming, Colorado, and Utah; northern Europe.



FIGURE 495.—*Agrostis longiligula*. Panicle, $\times 1$; glumes and floret, $\times 5$. (Type.)

37. *Agrostis longiligula* Hitchc. (Fig. 495.) Culms erect, about 60 cm. tall; ligule 5 to 6 mm. long; blades 10 to 15 cm. long, 3 to 4 mm. wide, scabrous; panicle narrow, but

loosely flowered, bronze purple, 10 to 15 cm. long, the branches very scabrous; glumes 4 mm. long; lemma 2.5 mm. long, bearing at the middle a bent exserted awn; palea minute. ☐ —Bogs and marshes at low altitudes, Tillamook County, Oreg., to Marin County, Calif.

AGROSTIS LONGILIGULA var. *AUSTRALIS* J. T. Howell. Ligule 4 to 11 mm. long; awn of lemma straight, about 1 mm. long or obsolete. ☐ —Wet places, Marin, Sonoma, and Mendocino Counties, Calif.

AGROSTIS NEBULOSA Boiss. and Reut. **CLOUDGRASS.** Culms slender, branching, about 30 cm. tall; foliage scant; panicle delicate, oblong, half as long as the plant, the branches in verticils; spikelets 1 mm. long. ☉ (Sometimes called *A. capillaris*, not *A. capillaris* L.)—Cultivated for dry bouquets. Spain.

72. *PHIPPSIA* (Trin.) R. Br.

Spikelets 1-flowered, the rachilla disarticulating above the glumes, not prolonged; glumes unequal, minute, the first sometimes wanting; lemma thin, somewhat keeled, 3-nerved, abruptly acute; palea a little shorter than the lemma, dentate. Dwarf, tufted perennial, with narrow, few-flowered panicles of small spikelets. Type species, *Phippsia algida*. Named for C. J. Phipps.

1. *Phippsia algida* (Phipps) R. Br. (Fig. 496.) Culms densely tufted, 2 to 10 cm. tall; blades soft, narrow,

with boat-shaped tip; lemma about 1.5 mm. long. ☐ —Summit of Grays Peak, Colo.; Arctic regions of both hemispheres.

73. *COLEANTHUS* Seidel

Spikelets 1-flowered; glumes wanting; lemma ovate, hyaline, terminating in a short awn; palea broad, 2-toothed, the keels awn-tipped. Dwarf annual, with short flat blades and small panicles. Type species, *Coleanthus subtilis*. Name from Greek *koleos*, sheath, and *anthos*, flower, alluding to the sheaths enclosing the base of the panicles.

1. *Coleanthus subtilis* (Tratt.) Seidel. (Fig. 497.) Culms spreading, forming little mats, mostly less than 5 cm. long; panicle 5 to 10 mm. long, the short branches verticillate; lemma about 1 mm. long, the awn about equaling the dark caryopsis. ☉ —Mud flats along the lower Columbia River, Oregon and Washington, well established but probably introduced; northern Eurasia.

Mibóra mínima (L.) Desv. Delicate annual, 3 to 10 cm. tall with short narrow blades and slender racemes of 6 to 8 appressed purple spikelets, 2 mm. long, the glumes obtuse, the lemma and palea shorter, pubescent. ☉ —Plymouth, Mass.; introduced from Europe.



FIGURE 496.—*Phippsia algida*.
Plant, $\times \frac{1}{2}$; glumes and floret,
 $\times 10$. (Oldmixon, Alaska.)





FIGURE 497.—*Coleanthus subtilis*. Plant, $\times 1$; lemma and palea and two views of spikelet with ripe caryopsis, $\times 20$. (Howell, Oreg.)

74. CÍNNA L. WOODREED

Spikelets 1-flowered, disarticulating below the glumes, the rachilla forming a stipe below the floret and produced behind the palea as a minute bristle; glumes equal or subequal, 1- to 3-nerved; lemma similar to the glumes, nearly as long, 3-nerved, bearing a minute, short, straight awn just below the apex (rarely awnless); palea 1-keeled. Tall perennials with flat blades and close or open panicles. Type species, *Cinna arundinacea*. *Cinna* (kinna) an old Greek name for a grass.

Our two species furnish highly palatable forage but usually are not abundant enough to be of much importance.

Spikelets 5 mm. long; panicle rather dense, the branches ascending.... 1. *C. ARUNDINACEA*.
Spikelets 3.5 to 4 mm. long; panicle loose, the branches spreading or drooping.

2. *C. LATIFOLIA*.

1. *Cinna arundinacea* L. STOUT WOODREED. (Fig. 498.) Culms erect, usually 1 to 1.5 m. tall, often somewhat bulbous at base, solitary or few in a tuft; sheaths glabrous; ligule rather prominent, thin; blades flat, scabrous, mostly less than 1 cm. wide; panicle many-flowered, nodding, grayish, 15 to 30 cm. long, the branches ascending; spikelets 5 to 6 mm. long; glumes somewhat unequal, acute, the second 3-nerved; lemma usually a little longer than the first glume, bearing below the tip a minute straight awn; palea apparently 1-nerved. ♀ —Moist woods, Maine to South Dakota, south to Georgia and eastern Texas. CINNA ARUNDINACEA var. INEXPÁNSA Fern. and Griseb. Panicle narrower, the shorter branches ascending; spikelets 3.7 to 4.2 mm. long. ♀ —Margin of swamps and moist woods, southeast Virginia.

2. *Cinna latifolia* (Trevir.) Griseb. DROOPING WOODREED. (Fig. 499.)

Resembling *C. arundinacea*; blades shorter and on the average wider, as much as 1.5 cm. wide; panicle green, looser, the branches fewer, spreading or drooping, naked at base for as much as 5 cm.; spikelets about 4 mm. long; awn of lemma sometimes as much as 1 mm. long (rarely wanting); palea 2-nerved, the nerves very close together. ♀ —Moist woods, Newfoundland and Labrador to Alaska, south to Connecticut, in the mountains to North Carolina and Tennessee, to Michigan, Illinois, South Dakota, in the Rocky Mountains to northern New Mexico, to Utah and central California; northern Eurasia.

75. LIMNÓDEA L. H. Dewey

Spikelets 1-flowered, disarticulating below the glumes, the rachilla prolonged behind the palea as a short slender bristle; glumes equal, firm; lemma membranaceous, smooth,



FIGURE 498.—*Cinna arundinacea*. Plant, $\times \frac{1}{2}$; glumes and floret, $\times 10$. (Dewey 336, Va.)



FIGURE 499.—*Cinna latifolia*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Sandberg 713, Minn.)

nerveless, 2-toothed at the apex, bearing from between the teeth a slender bent awn, twisted at base; palea a little shorter than the lemma. Slender annual with flat blades and narrow panicles. Type species, *Limnodea arkansana*. Name altered from *Limnas*, a genus of grasses.



FIGURE 500.—*Limnodea arkansana*. Plant, $\times \frac{1}{2}$; glumes and floret, $\times 10$. (Orcutt 5910, Tex.)

1. *Limnodea arkansána* (Nutt.) L. H. Dewey. (Fig. 500.) Culms branching at base, 20 to 40 cm. tall; blades more or less pubescent on both surfaces; panicle 5 to 15 cm. long, narrow but loose; spikelets 3.5 to 4 mm. long; glumes hispidulous or

pilose; awn 8 to 10 mm. long. 2 —Dry soil, prairies and river banks, Coastal Plain, Florida to Texas, Arkansas, and Oklahoma. The form with pilose glumes has been called *L. arkansána* var. *pilosa* (Trin.) Scribn.

76. *ALOPECÚRUS* L. FOXTAIL

Spikelets 1-flowered, disarticulating below the glumes, strongly compressed laterally; glumes equal, usually united at base, ciliate on the keel; lemma about as long as the glumes, 5-nerved, obtuse, the margins united at base, bearing from below the middle a slender dorsal awn, this included or exerted two or three times the length of the spikelet; palea wanting. Low or moderately tall perennials or some annuals, with flat blades and soft, dense, spikelike panicles. Type species, *Alopecurus pratensis*. Name from Greek *alopex*, fox, and *oura*, tail, alluding to the cylindric panicle.

The species of *Alopecurus* are all palatable and nutritious forage grasses, but usually are not found in sufficient abundance to be of great importance. *A. pratensis*, meadow foxtail, is sometimes used as a meadow grass in the eastern United States; *A. aequalis* is the most common on the western ranges.

Spikelets 5 to 6 mm. long. Introduced perennials.

Panicle slender, tapering at each end; glumes scabrous on the keel.

1. *A. MYOSUROIDES*.

Panicle cylindric, dense; glumes conspicuously ciliate on the keel..... 2. *A. PRATENSIS*. Spikelets 2 to 4 mm. long (rarely 5 mm. in *A. saccatus*, annual). Native species.

Plants perennial.

Spikelets densely woolly all over; panicle oblong, 1 to 5 cm. long, about 1 cm. thick.

3. *A. ALPINUS*.

Spikelets not woolly; panicle linear or oblong-linear, less than 1 cm. thick.

Awn scarcely exceeding the glumes..... 5. *A. AEQUALIS*.

Awn exerted 2 mm. or more.

Awn exerted 2 to 3 mm.; panicle 3 to 4 mm. thick; spikelets 2.5 mm. long.

6. *A. GENICULATUS*.

Awn exerted 3 to 5 mm.; panicle 4 to 6 mm. thick; spikelets about 3 mm. long.

4. *A. PALLESCENS*.

Plants annual.

Spikelets 4 to 5 mm. long; panicle relatively loose..... 9. *A. SACCATUS*.

Spikelets 2 to 3.5 mm. long; panicle dense.

Spikelets 2 to 2.5 mm. long; anthers 0.5 mm. long..... 7. *A. CAROLINIANUS*.

Spikelets 3 to 3.5 mm. long; anthers about 1 mm. long..... 8. *A. HOWELLII*.

1. *Alopecurus myosuroides* Huds.

(Fig. 501.) Annual; culms tufted, slightly scabrous, 10 to 50 cm. tall, erect or decumbent at base; blades usually 2 to 3 mm. wide; panicle slender, somewhat tapering at each end, 4 to 10 cm. long, 3 to 5 mm. wide; glumes 6 mm. long, pointed, whitish with 3 green nerves, glabrous, scabrous on the keel, short-ciliate at base; lemma about as long as the glumes, the awn bent, exerted 5 to 8 mm. ☉ (*A. agrestis* L.)—Fields, waste places, and ballast ground, Maine to North Carolina, Kansas,

Texas, Washington, to California; introduced, rare; Eurasia.

2. *Alopecurus pratensis* L. MEADOW FOXTAIL. (Fig. 502.) Perennial; culms erect, 30 to 80 cm. tall; blades 2 to 6 mm. wide; panicle 3 to 7 cm. long, 7 to 10 mm. thick; glumes 5 mm. long, villous on the keel and pubescent on the sides; awn exerted 2 to 5 mm. 2 —Fields and waste places, Newfoundland and Labrador to Alaska, south to Delaware and Missouri; Montana, Idaho, and Oregon.

Introduced; Eurasia. Occasionally cultivated as a meadow grass.

3. *Alopecurus alpinus* J. E. Smith.

ALPINE FOXTAIL. (Fig. 503.) Perennial; culms erect or often decumbent at base, rather stiff and rushlike, 10 to 80 cm. tall, with slender rhizomes; sheaths glabrous, often inflated; blades 3 to 5 mm. wide; panicle ovoid or oblong, 1 to 4 cm. long, about 1 cm. wide, woolly; glumes 3 to 4 mm. long, woolly; lemma awned near the base, the awn exerted slightly or as much as 5 mm. ♀ —Mountain meadows and along brooks, Greenland to Alaska, south in the Rocky Mountains to Colorado and Utah; Arctic regions and northern Eurasia.

4. *Alopecurus palléscens* Piper.

WASHINGTON FOXTAIL. (Fig. 504.) Perennial, tufted, pale green; culms 30 to 50 cm. tall, erect, or lower nodes geniculate; sheaths somewhat inflated; panicle pale, dense, 2 to 7 cm. long, 4 to 6 mm. thick; glumes about 3 mm. long, ciliate on the keel, appressed-pubescent on the sides; lemma awned near the base, the awn exerted 3 to 5 mm.; anthers about 2 mm. long. ♀ —Edges of ponds and wet places, British Columbia and Montana to Washington and northern California.

5. *Alopecurus aequalis* Sobol. SHORT-AWN FOXTAIL. (Fig. 505.) Perennial; culms erect or spreading, usually not rooting at the nodes, 15 to 60 cm. tall; blades 1 to 4 mm. wide; panicle slender, 2 to 7 cm. long, about 4 mm. thick; spikelets 2 mm. long; awn of lemma scarcely exerted; anthers about 0.5 mm. long. ♀ (*A. aristulatus* Michx.)—In water and wet places, Greenland to Alaska, south to Pennsylvania, Illinois, Kansas, New Mexico, and California; Eurasia.

6. *Alopecurus geniculatus* L. WATER FOXTAIL. (Fig. 506.) Differing from *A. aequalis* chiefly in the usually more decumbent culms rooting at the nodes and the longer awn exerted 2 to 3 mm., giving the panicle a softly bristly appearance; spikelets about 2.5 mm. long, the tip dark purple;

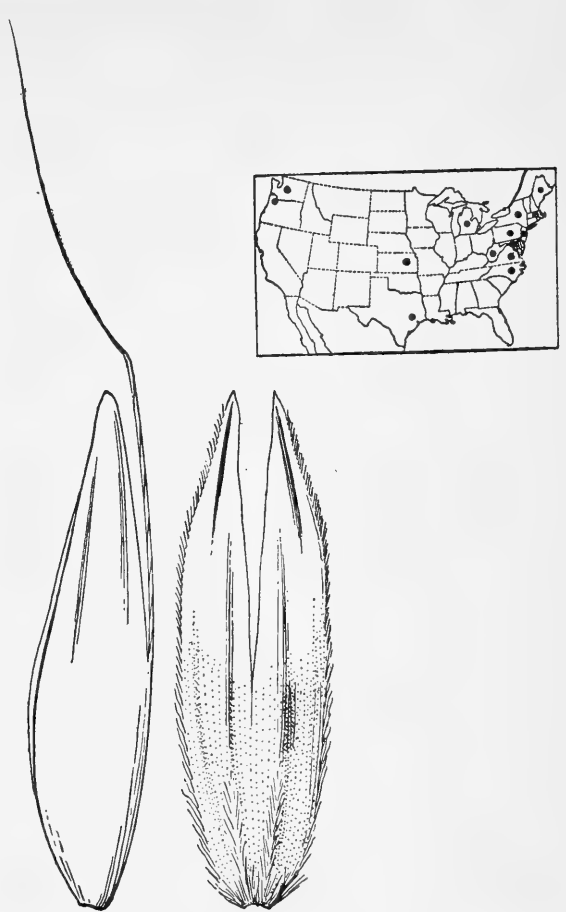


FIGURE 501.—*Alopecurus myosuroides*. Glumes and floret, $\times 10$. (Commons, 14, Del.)

awn of lemma about as long again as the spikelet; anthers about 1.5 mm. long. ♀ —In water and wet places, Newfoundland to Saskatchewan and British Columbia; Maine to Virginia; Pennsylvania, Michigan, Wisconsin; Kansas and Wyoming to Utah; Montana; Washington to California and Arizona; Eurasia.

7. *Alopecurus carolinianus* Walt. (Fig. 507.) Annual; culms tufted, much branched at base, 10 to 50 cm. tall; similar to *A. geniculatus* and *A. aequalis*, but panicle more slender than in the former; spikelets 2 to 2.5 mm. long, pale, the awn as in *A. geniculatus*; anthers about 0.5 mm. long. ♂ (*A. ramosus* Poir.)—Moist open ground, old fields, and wet places, British Columbia; Long Island, N. Y., to Florida, Washington, and California, except West Virginia, Nevada, and New Mexico.

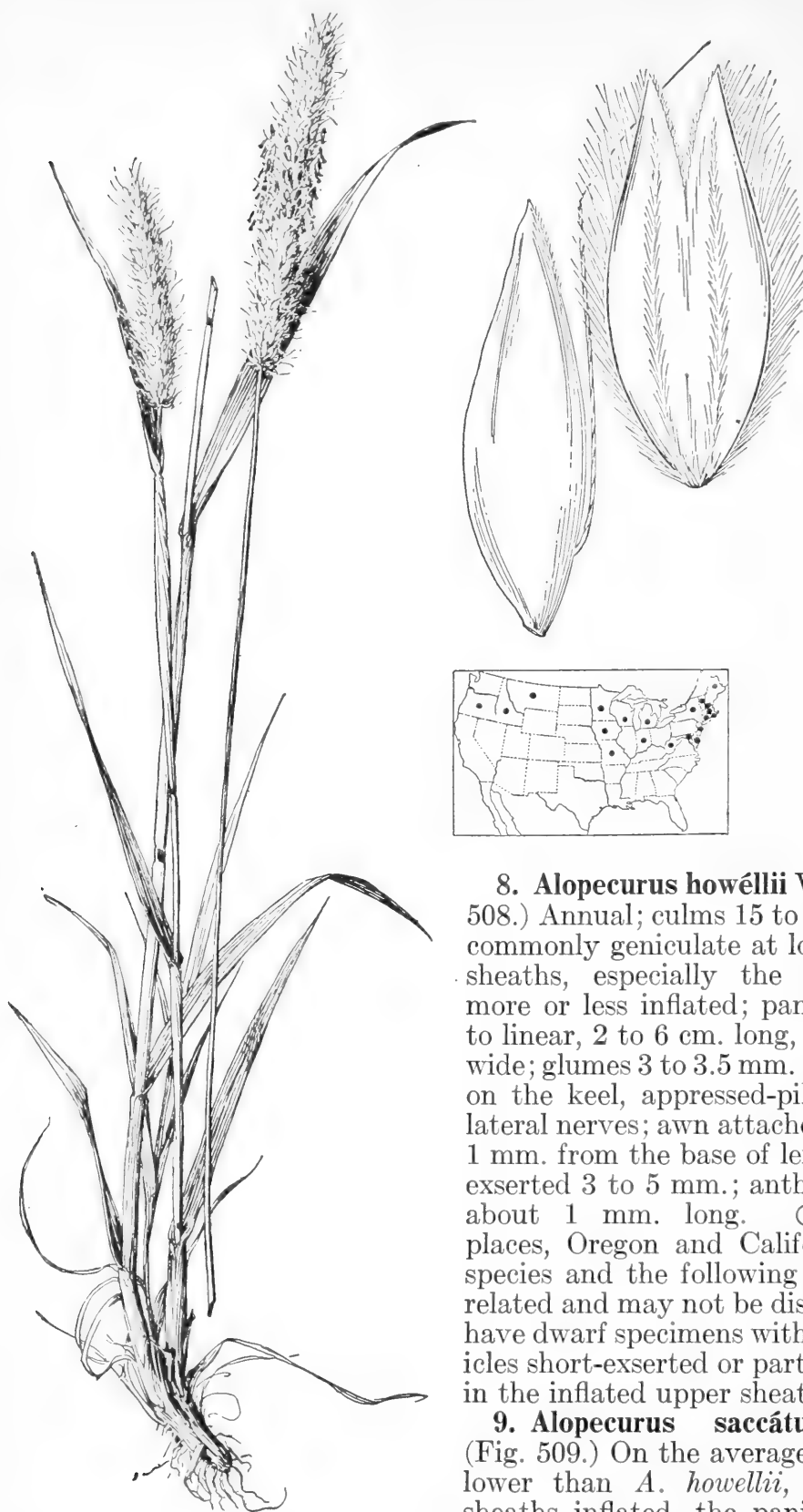


FIGURE 502.—*Alopecurus pratensis*. Plant, $\times \frac{1}{2}$; glumes and floret, $\times 10$. (Henderson, Oreg.)

8. *Alopecurus howellii* Vasey. (Fig. 508.) Annual; culms 15 to 30 cm. tall, commonly geniculate at lower nodes; sheaths, especially the uppermost, more or less inflated; panicle oblong to linear, 2 to 6 cm. long, 4 to 7 mm. wide; glumes 3 to 3.5 mm. long, ciliate on the keel, appressed-pilose on the lateral nerves; awn attached less than 1 mm. from the base of lemma, bent, exserted 3 to 5 mm.; anthers orange, about 1 mm. long. \odot —Wet places, Oregon and California. This species and the following are closely related and may not be distinct. Both have dwarf specimens with small panicles short-exserted or partly included in the inflated upper sheath.

9. *Alopecurus saccatus* Vasey. (Fig. 509.) On the average somewhat lower than *A. howellii*, the upper sheaths inflated, the panicle 2 to 4 cm. long, rather less dense, short exserted or partly included; spikelets 4 to 5 mm. long, the awn exserted 5 to

8 mm.; anthers 1 mm. long. ☉ — Wet places, along the Columbia River, Washington and Oregon; California (Colusa County).

Alopecurus créticus Trin. Annual, 10 to 40 cm. tall; panicle dense; spikelets wedge-shaped, 4 mm. long; glumes firm, the keels broadly winged toward the summit, ciliate; lemma truncate, the awn from near the base. Waif, ballast, Philadelphia, Pa.; Europe.

Alopecurus réndlei Eig. Annual; culms 15 to 30 cm. tall, geniculate;



FIGURE 503.—*Alopecurus alpinus*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Hall and Harbour 682, Colo.)

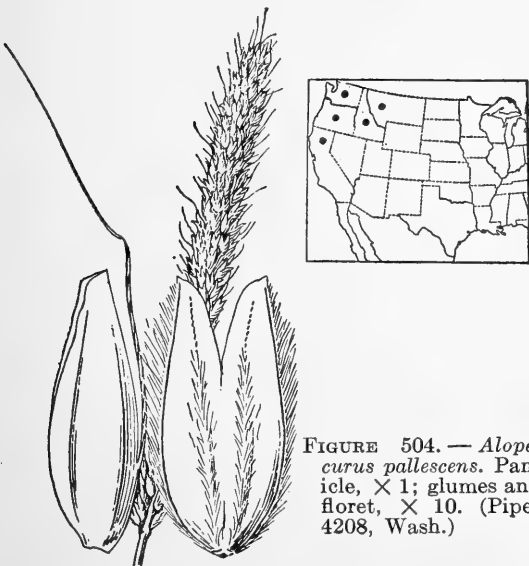


FIGURE 504.—*Alopecurus pallescens*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Piper 4208, Wash.)



FIGURE 505.—*Alopecurus aequalis*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Fernald, Maine.)



FIGURE 506.—*Alopecurus geniculatus*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Weatherby 3394, Mass.)

upper sheaths inflated; panicle 1.5 to 2 cm. long, 7 to 9 mm. wide; spikelets 5 to 6 mm. long, almost diamond-shaped, the glumes inflated-gibbous

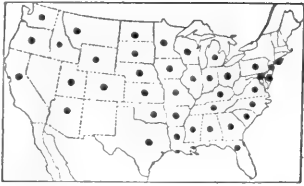


FIGURE 507.—*Alopecurus carolinianus*. Plant, $\times 1$; glumes and floret, $\times 10$. (Kearney 1147, Va.)



FIGURE 508.—*Alopecurus howellii*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Gilbert 78, Oreg.)

and indurate on the back about the middle; awn 5 to 10 mm. long. ☉ —Waif, ballast, old Navy Yard, Philadelphia, Pa.; Europe.



FIGURE 509.—*Alopecurus saccatus*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Suksdorf 188, Wash.)

***Alopecurus arundinaceus* Poir.** Tall rhizomatous perennial; blades 3 to 10 mm. wide; panicle 4 to 10 cm. long, 7 to 8 mm. thick, often purplish; spikelets 4 to 5 mm. long; glumes sparsely pubescent, long-ciliate on the keel; lemma about equaling the glumes, the awn included or exserted 1 to 3 mm. ☉ —Adventive in hay meadows, Labrador; North Dakota; Eurasia.

77. POLYPÓGON Desf.

Spikelets 1-flowered, the pedicel disarticulating a short distance below the glumes, leaving a short-pointed callus attached; glumes equal, entire or 2-lobed, awned from the tip or from between the lobes, the awn slender, straight; lemma much shorter than the glumes, hyaline, usually bearing a

slender straight awn shorter than the awns of the glumes. Usually decumbent annuals or perennials with flat scabrous blades and dense, bristly, spikelike panicles. Type species, *Polypogon monspeliensis*. Name from Greek *polus*, much, and *pogon*, beard, alluding to the bristly inflorescence.

One species, *P. monspeliensis*, is palatable to stock and is sometimes sufficiently abundant on low meadows to be of importance in the West.

Plants annual.

Glumes slightly lobed, the lobes not ciliate..... 1. *P. MONSPELIENSIS*.

Glumes prominently lobed, the lobes ciliate-fringed..... 2. *P. MARITIMUS*.

Plants perennial.

Glumes gradually narrowed into the awn..... 5. *P. ELONGATUS*.

Glumes abruptly rounded at summit.

Awns rather stiff and straight; glumes 2.5 to 3 mm. long..... 3. *P. INTERRUPTUS*.

Awns delicate, flexuous; glumes 1.5 to 2 mm. long..... 4. *P. AUSTRALIS*.

1. *Polypogon monspeliensis* (L.) Desf. RABBITFOOT GRASS. (Fig. 510.) Annual; culms erect or decumbent at base, 15 to 50 cm. tall (sometimes depauperate or as much as 1 m. tall); ligule 5 to 6 mm. long; blades in average plants 4 to 6 mm. wide; panicle dense, spikelike, 2 to 15 cm. long, 1 to 2 cm. wide, tawny yellow when mature; glumes hispidulous, about 2 mm. long, the awns 6 to 8 mm. long, rarely longer; lemma smooth and shining, about half as long as the glumes, the delicate awn slightly exceeding them. ☉ —Ballast and waste places, New Brunswick to Georgia, Oklahoma, and Texas, west to Alaska and California, infrequent in the East, mostly confined to the coastal States, a common weed in the Western States; at low altitudes, south to Argentina; introduced from Europe.

2. *Polypogon maritimus* Willd. (Fig. 511.) Annual; culms 20 to 30 cm. tall, upright or spreading; ligule as much as 6 mm. long; blades usually less than 5 cm. long, 2 to 4 mm. wide; panicle mostly smaller and less dense than in *P. monspeliensis*; glumes about 2.5 mm. long, hispidulous below, the deep lobes ciliate-fringed, the awns 7 to 10 mm. long; lemma awnless. ☉ —Introduced, Georgia (Tybee Island); Nebraska, California (Napa and New York Falls, Amador County); Mediterranean region.

3. *Polypogon interruptus* H. B. K. DITCH POLYPOGON. (Fig. 512.) Perennial; culms tufted, geniculate at base, 30 to 80 cm. tall; ligule 2 to 5 mm.

long or the uppermost longer; blades commonly 4 to 6 mm. wide; panicle oblong, 5 to 15 cm. long, more or less interrupted or lobed; glumes equal, 2.5 to 3 mm. long, scabrous, the awns 3 to 5 mm. long; lemma smooth and shining, 1 mm. long, minutely toothed at the truncate apex, the awn exceeding the glumes. ♀ (*P. lutosus* of Manual, ed. 1, a doubtful species of Europe.)—Ditches and wet places at low altitudes, British Columbia to California, east to Louisiana; Nebraska; Oklahoma; south to Argentina.

4. *Polypogon australis* Brongn. (Fig. 513.) Perennial; culms as much as 1 m. tall; ligule 2 to 3 mm. long, fragile; blades commonly 5 to 7 mm. wide; panicle soft, lobed or interrupted, mostly 8 to 15 cm. long, the numerous awns purplish; glumes 1.5 to 2 mm. long, hispidulous, the awn flexuous, delicate, 4 to 6 mm. long; lemma about two-thirds as long as the glumes, the awn about 3 mm. long. ♀ (*P. crinitus* Trin., not Nutt.)—Introduced at Bingen, Wash.; Chile and Argentina.

5. *Polypogon elongatus* H. B. K. (Fig. 514.) Perennial; culms rather coarse, as much as 1 m. tall, erect or decumbent at base; sheaths glabrous; ligule prominent, as much as 8 mm. long, lacerate, decurrent; blades 10 to 20 cm. long, 6 to 8 mm. or as much as 10 mm. wide, very scabrous; panicle erect or nodding, loose, interrupted, 15 to 30 cm. long, the branches clustered, densely flowered to the base; glumes about 3 mm. long,



FIGURE 510.—*Polypogon monspeliensis*. Plant, $\times \frac{1}{2}$; glumes and floret, $\times 10$. (Chase 5584, Calif.)

hispidulous, gradually narrowed to an awn 2 to 3 mm. long; lemma 1.5 mm. long, the awn 1 to 2 mm. long.

—Wet places, along streams and

ditches, Arizona (Santa Rita Mountains); Mexico to Argentina.

78. LYCÚRUS H. B. K.

Spikelets 1-flowered; glumes awned, the first usually 2-awned; lemma narrow, firm, longer than the glumes, tapering into a slender awn. Slender perennial, with grayish, bristly spike-like panicles, the spikelets borne in

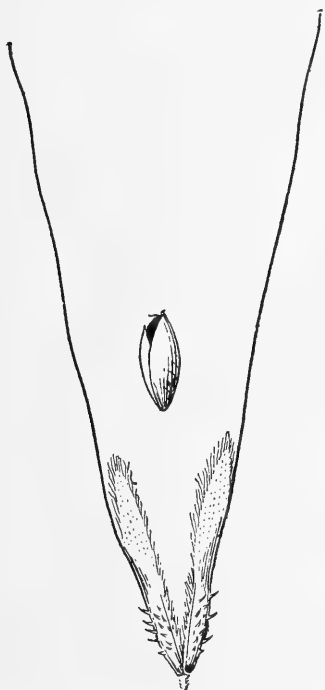


FIGURE 511.—*Polypogon maritimus*, $\times 10$. (Hansen 607, Calif.)



FIGURE 512.—*Polypogon interruptus*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Hitchcock 2686, Calif.)



FIGURE 513.—*Polypogon australis*, $\times 10$. (Suksdorf 10091, Wash.)

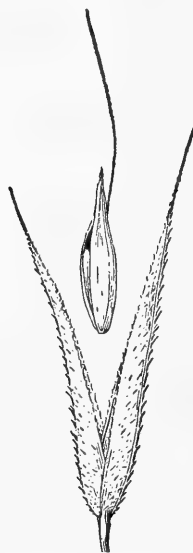


FIGURE 514.—*Polypogon elongatus*. Glumes and floret, $\times 10$. (Silveus 3488, Ariz.)

pairs, the lower of the pair sterile, the two falling together. Type species, *Lycurus phleoides*. Name for Greek *lukos*, wolf, and *oura*, tail, alluding to the spikelike panicles.

1. *Lycurus phleoides* H. B. K.
WOLFTAIL. (Fig. 515.) Culms densely tufted, 20 to 60 cm. tall, compressed, erect or decumbent at base; blades flat or folded, 1 to 2 mm. wide, those of the culm mostly less than 10 cm. long; panicle 3 to 6 cm. long, about 5 mm. thick; spikelets including awns about 5 mm. long, the glumes shorter than the lemma, the first 2- or 3-



FIGURE 515.—*Lycurus phleoides*. Plant, $\times \frac{1}{2}$; glumes and floret, $\times 10$. (Rydberg 2363, Colo.)



FIGURE 516.—*Phleum pratense*. Plant, $\times \frac{1}{2}$; glumes and floret, $\times 10$. (Mearns 2209, Wyo.)

awned, the second usually 1-awned, the awns slightly spreading; lemma 3-nerved, pubescent on the margins, the awn 2 to 3 mm. long; palea about as long as the lemma, pubescent. 2

—Plains and rocky hills, Colorado and Utah to Texas and Arizona, south to southern Mexico. Adventive in wool waste, Maine. An important southwestern forage grass.

79. PHLEUM L. TIMOTHY

Spikelets 1-flowered, laterally compressed, disarticulating above the glumes; glumes equal, membranaceous, keeled, abruptly mucronate or awned or gradually acute; lemma shorter than the glumes, hyaline, broadly truncate, 3- to 5-nerved; palea narrow, nearly as long as the lemma. Annuals or perennials, with erect culms, flat blades, and dense, cylindric panicles. Type species, *Phleum pratense*. Name from Greek *phleos*, an old name for a marsh reed.

The common species, *P. pratense*, or timothy, is our most important hay grass. It is cultivated in the humid regions, the Northeastern States, south to the Cotton Belt, and west to the 100th meridian, and also in the humid region of Puget Sound and in mountain districts. The native species, *P. alpinum*, alpine timothy, furnishes forage in mountain meadows of the Western States.

Panicle cylindric, several times longer than wide..... 1. *P. PRATENSE*.
Panicle ovoid or oblong, usually not more than twice as long as wide..... 2. *P. ALPINUM*.

1. *Phleum pratense* L. TIMOTHY. (Fig. 516.) Culms 50 to 100 cm. tall, from a swollen or bulblike base, forming large clumps; blades elongate, mostly 5 to 8 mm. wide; panicle cylindric, commonly 5 to 10 cm. long, often longer, the spikelets crowded, spreading; glumes about 3.5 mm. long, truncate with a stout awn 1 mm. long, pectinate-ciliate on the keel. 2 — Commonly escaped from cultivation along roadsides and in fields and waste places throughout the United States; Eurasia. In some localities known as herd's grass.

2. *Phleum alpinum* L. ALPINE TIMOTHY. (Fig. 517.) Culms 20 to 50 cm. tall, from a decumbent, somewhat creeping, densely tufted base; blades mostly less than 10 cm. long, 4 to 6 mm. wide; panicle ellipsoid or short-cylindric, bristly; glumes about 5 mm. long, hispid-ciliate on the keel, the awns 2 mm. long. 2 — Common in mountain meadows, in bogs and wet places, Greenland to Alaska, south in the mountains of Maine and New Hampshire; northern Michigan; in the mountains of the Western States to New Mexico and California; also on the seacoast at Fort Bragg, Calif., and northward; Mexico; Eur-



FIGURE 517.—*Phleum alpinum*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Clements 337, Colo.)

asia and Arctic and alpine regions of the Southern Hemisphere.

***Phleum arenarium* L.** Annual; culms tufted, 5 to 30 cm. tall; foliage scant, mostly basal, the blades 2 to 4 cm. long; panicle 1 to 3 cm. long, somewhat tapering at each end; glumes acuminate, strongly ciliate on



FIGURE 518.—*Gastridium ventricosum*. Plant, $\times \frac{1}{2}$; glumes and floret, $\times 10$. (Davy and Blasdale 5340, Calif.)

the keel. ☉ —Ballast near Portland, Oreg.; coast of Europe and North Africa.

Phleum subulatum (Savi) Aschers. and Graebn. Annual; culms 10 to 20 cm. tall; blades 2 to 5 cm. long; panicle linear-oblong, mostly 3 to 8 cm. long, 4 to 5 mm. thick; glumes 2 mm. long, scaberrulous, subacute, the tips approaching. ☉ —Ballast, Philadelphia, Pa., and near Portland, Oreg.; Mediterranean region.

Phleum paniculatum Huds. Annual; culms 10 to 30 cm. tall; foliage scabrous; panicle cylindric, 2 to 5 cm. long, 3 to 6 mm. thick; glumes 2 mm. long, glabrous, hard, widened upward to a truncate swollen summit, with a hard awn-point at the tip. ☉ —Ballast near Portland, Oreg.; Mediterranean region.

80. GASTRIDIUM Beauv.

Spikelets 1-flowered, the rachilla disarticulating above the glumes, prolonged behind the palea as a minute bristle; glumes narrow, unequal, somewhat swollen at the base; lemma much shorter than the glumes, hyaline, broad, truncate, awned or awnless; palea about as long as the lemma. Annual with flat blades and pale, shining, spikelike panicles. Type species, *Milium lendigerum* L. (*G. ventricosum*). Name from Greek *gastridion*, a small pouch, alluding to the slightly saccate glumes.

1. Gastridium ventricosum (Gouan) Schinz and Thell. NITGRASS. (Fig. 518.) Culms 20 to 40 cm. tall; foliage scant, blades scabrous; panicle 5 to 8 cm. long, dense, spikelike; spikelets slender, about 5 mm. long; glumes tapering into a long point, the second about one-fourth shorter than the first; floret minute, plump, pubescent, the delicate awn 5 mm. long, somewhat geniculate. ☉ —Open ground and waste places, Oregon to California; Texas; also Boston, Mass.; introduced from Europe. A common weed on the Pacific coast, of no economic value.

81. LAGURUS L.

Spikelets 1-flowered, the rachilla disarticulating above the glumes, pilose under the floret, produced beyond the palea as a bristle; glumes subequal, thin, 1-nerved, villous, gradually tapering into a plumose awn-point; lemma shorter than the glumes, thin, glabrous, bearing on the back above the middle a slender, exserted, somewhat geniculate, awn, the summit bifid, the divisions delicately awn-tipped; palea narrow, thin, the two keels ending in minute awns. Annual, with pale, dense, ovoid or oblong woolly heads. Type species, *Lagurus ovatus*. Name from Greek

lagos, hare, and *oura*, tail, alluding to the woolly heads.

1. *Lagurus ovatus* L. (Fig. 519.) Culms branching at the base, 10 to 30 cm. tall, slender, pubescent; sheaths and blades pubescent, the sheaths somewhat inflated, the blades flat, lax; panicle 2 to 3 cm. long, nearly as thick, pale and downy, bristling with dark awns; glumes very narrow, 10 mm. long, the awns of the lemmas much exceeding them. ☉ —Cultivated for ornament and sparingly escaped; New Jersey; Pacific Grove, San Francisco, and Berkeley, Calif.; ballast, Beaufort, N. C.; Mediterranean region.

82. MUHLENBERGIA Schreb. MUHLY

Spikelets 1-flowered (occasionally 2-flowered), the rachilla disarticulating above the glumes; glumes usually shorter than the lemma, sometimes as long, obtuse to acuminate or awned, keeled or convex on the back, the first sometimes small, rarely obsolete; lemma firm-membranaceous, 3-nerved (the nerves sometimes obscure or rarely an obscure additional pair), with a very short callus, rarely long-pilose, usually minutely pilose, the apex acute, awned from the tip or just below it, or from between very short lobes, sometimes only mucronate, the awn straight or flexuous. Perennial, or rarely annual, low or moderately tall or rarely robust grasses, tufted or rhizomatous, the culms simple or much-branched, the inflorescence a narrow (sometimes spikelike) or open panicle. Type species, *Muhlenbergia schreberi*. Named for G. H. E. Muhlenberg.

Many of the western species are important range grasses, forming a considerable proportion of the grass flora of the arid and semiarid regions, and long ago dubbed "muhly" by forest rangers. The most important of these are *M. montana* on mesas and rocky hills of the Western States, *M. pauciflora*, *M. emersleyi*, and *M. wrightii* in the Southwest.

1a. Plants annual.**2a. Lemma awned.**

Awn of lemma 0.5 to 3 mm. long; glumes acuminate, hirsute.

Spikelets 1.5 to 1.8 mm. long; relatively long pediceled and spreading along the panicle branches..... 5. *M. TEXANA*.

Spikelets 2 to 2.5 mm. long; short pediceled and mostly appressed along the panicle branches..... 6. *M. ELUDENS*.

Awn of lemma more than 5 mm. long.

Second glume 3-nerved and often 3-toothed..... 9. *M. PULCHERRIMA*.

Second glume 1-nerved (rarely 2-nerved).

First glume 2-nerved and usually bidentate.

Glumes equal to or slightly longer than the floret; lemma about 3 mm. long; awn 2 to 10 mm. long..... 11. *M. DEPAUPERATA*.

Glumes shorter than the floret, sometimes minute, but usually about half as long as the lemma; lemma 4 to 5 mm. long; awn 10 to 20 mm. long.

12. *M. BREVIS*.

First glume 1-nerved (rarely 2-nerved), entire or erose, but not bidentate.

Glumes acuminate or aristate. Lateral nerves of lemma often ciliate.

10. *M. PECTINATA*.



FIGURE 519.—*Lagurus ovatus*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Heller 5340, Calif.)

Glumes obtuse.

Panicle open, the branches spreading; lemma 2.5 to 3.5 mm. long.

7. *M. MICROSPERMA*.

Panicle very narrow, the branches appressed; lemma 4.5 to 6 mm. long.

8. *M. APPRESSA*.

2b, Lemma awnless (see also *M. texana*). Culms branching and panicle-bearing at base.

- Pedicels capillary, elongate.
 Panicles very diffuse; pedicels straight; glumes glabrous..... 3. *M. FRAGILIS*.
 Panicles open but scarcely diffuse; glumes pilose.
 Pedicels sinuous and tangled; glumes long-pilose..... 4. *M. SINUOSA*.
 Pedicels straight or subflexuous; glumes minutely pilose.... 2. *M. MINUTISSIMA*.
 Pedicels short, appressed; glumes glabrous.
 Panicles loose, delicate; spikelets 1 to 1.2 mm. long..... 1. *M. WOLFFII*.
 Panicles narrow, contracted; spikelets 2 mm. long..... 13. *M. FILIFORMIS*.
 Culms simple, compressed..... 29. *M. UNIFLORA*.
- 1b. Plants perennial.
 3a. Rhizomes developed, usually prominent, scaly, creeping, often branching.
 4a. Blades 2 mm. wide or less, mostly short and involute.
 5a. Panicles open, the spikelets on slender pedicels.
 Spikeless awned, 4 to 5 mm. long; blades involute. Panicle branches in stiffly spreading fascicles..... 50. *M. PUNGENS*.
 Spikelets awnless, acutish or mucronate, 1 to 2 mm. long; blades flat.
 Sheaths compressed keeled; panicle oblong; eastern species.
 28. *M. TORREYANA*.
 Sheaths rounded; panicle as broad as long; western species.
 Ligule 1 to 2 mm. long, auricled..... 26. *M. ARENACEA*.
 Ligule minute, not auricled..... 27. *M. ASPERIFOLIA*.
- 5b. Panicles narrow, more or less condensed, the spikelets on short pedicels.
 Culms tall, stout, somewhat woody at base, as much as 6 mm. thick, 1 to 3 m. tall.
 30. *M. DUMOSA*.
 Culms lower, slender.
 Lemma and palea glabrous.
 Culms smooth, widely creeping, the blades fine, conspicuously recurved, spreading.
 Spikelets about 3 mm. long..... 14. *M. REPENS*.
 Spikelets about 2 mm. long..... 15. *M. UTILIS*.
 Culms nodulose-roughened, erect or decumbent at base, sometimes spreading, but not widely creeping..... 16. *M. RICHARDSONIS*.
 Lemma and palea pilose or villous on the lower half.
 Awns 6 to 10 mm. long.
 Panicles densely flowered; glumes as long as the floret.
 21. *M. POLYCAULIS*.
 Panicles loosely flowered; glumes about half as long as the floret.
 23. *M. ARSENEI*.
 Awns 1 to 3 mm. long or the lemma mucronate only.
 Blades 5 to 10 cm., rarely 15 cm. long, flat..... 20. *M. GLAUCA*.
 Blades 1 to 3 cm. long, involute or pungently pointed.
 Glumes about half as long as the floret; lemma 2 to 2.5 mm. long.
 17. *M. VILLOSA*.
 Glumes nearly as long as the floret; lemma 3 to 4 mm. long.
 Culms glabrous below the nodes; sheaths glabrous (rarely pubescent below the summit); ligule 1 mm. long, short lacerate; lemma loosely villous on the margins on lower half and at the very base, mucronate to short awned..... 18. *M. THURBERI*.
 Culms strigose below the nodes; sheaths often strigose to hirsute; ligule 0.5 to 1 mm. long; lemma densely villous on lower half; awn 1 to 3 mm. long..... 19. *M. CURTIFOLIA*.
- 4b. Blades flat, at least some of them more than 3 mm., usually 5 mm. wide or more.
 6a. Panicles loosely flowered, slender, much exceeding the leaves (see also *M. sylvatica*); glumes broad below, abruptly pointed, shorter than the body of the lemma.
 Culms slender, rather weak, becoming much branched, glabrous or slightly scabrous below the nodes. Lemma acuminate, 2.5 to 3.5 mm. long, awned.
 37. *M. BRACHYPHYLLA*.
 Culms erect, simple or sparingly branched.
 Spikelets 1.5 to 2.5 mm. long; lemma awnless or awn-tipped; blades commonly not more than 5 to 7 mm. wide..... 35. *M. SOBOLIFERA*.
 Spikelets 3 to 4 mm. long; lemma with an awn 2 to 5 times as long as the body; blades commonly 8 mm. or more wide..... 36. *M. TENUIFLORA*.
- 6b. Panicles usually densely flowered (sometimes loose in *M. sylvatica*); glumes tapering from base to apex. Culms commonly freely branching (often simple or nearly so in *M. glomerata*).
 Hairs at base of floret copious, as long as the body of the lemma.... 31. *M. ANDINA*.
 Hairs at base of floret inconspicuous, not more than half as long as the lemma.

- Glumes with stiff scabrous awn-tips, much exceeding the awnless lemma; panicles terminal on the culm or leafy branches, compact, interrupted, bristly. Culms mostly simple or branching at base; internodes minutely puberulent; sheaths not or scarcely keeled..... 32. *M. GLOMERATA*.
 Culms subcompressed, mostly branching from the middle nodes; internodes smooth and glossy except at summit; sheaths keeled..... 33. *M. RACEMOSA*.
 Glumes acuminate, sometimes awn-tipped but not stiff and exceeding the lemma; panicles terminal and axillary, numerous, not bristly. Culms glabrous below the nodes; panicles not compact, the branches ascending; plants sprawling, top-heavy, the branchlets geniculate-spreading..... 38. *M. FRONDOSA*.
 Culms strigose below the nodes; panicles compact or if not the branches erect or nearly so; plants often bushy-branching but not sprawling with geniculate branchlets. Callus hairs wanting; lemma nearly smooth, awnless..... 39. *M. GLABRIFLORA*.
 Callus hairs present; lemma pubescent below. Panicles not compactly flowered; lemma with awn as much as 10 mm. or more long (nearly awnless in forma *attenuata*); some of the blades 10 to 15 cm. or more long..... 40. *M. SYLVATICA*.
 Panicles compactly flowered or, if not, lemma awnless; blades commonly less than 10 cm. long, but sometimes longer. Sheaths glabrous..... 41. *M. MEXICANA*.
 Sheaths scabrous..... 34. *M. CALIFORNICA*.
- 3b. Rhizomes wanting, the culms tufted, usually erect.
 7a. Culms decumbent and rooting at the nodes. Spikelets awnless; panicles open, diffuse..... 29. *M. UNIFLORA*.
 Spikelets awned; panicles narrow, the branches ascending or appressed. Glumes minute, the first sometimes wanting..... 42. *M. SCHREBERI*.
 Glumes evident, as much as 3 mm. long (see also *M. schreberi* var. *palustris*). Awns 1 to 2 mm. long..... 43. *M. CURTISETOSA*.
 Awns 5 to 20 mm. long..... 22. *M. PAUCIFLORA*.
- 7b. Culms erect or spreading, but not rooting at the nodes. Second glume 3-toothed (rarely not toothed in *M. filiculmis*). Lemma 4 mm. long; culms relatively stout, 15 to 60 cm. tall.... 45. *M. MONTANA*.
 Lemma 2.5 to 3 mm. long; culms filiform, 10 to 20 cm. tall.... 46. *M. FILICULMIS*.
 Second glume usually acute or awned, sometimes erose-toothed, not distinctly 3-toothed.
 8a. Panicle narrow or spikelike, the branches floriferous from the base or nearly so (see also *M. metcalfei*).
 9a. Lemma acute, acuminate, mucronate or short-awned. Blades involute. Panicle elongate and spikelike. Glumes and lemma or some of them awn-tipped..... 70. *M. MARSHII*.
 Glumes acute to blunt or erose; lemma not awn-tipped. Ligule 2 to 3 mm. long; lower panicle branches sometimes 5 to 10 cm. long..... 68. *M. RIGENS*.
 Ligule 1 to 2 mm. long; lower panicle branches seldom more than 3 cm. long..... 69. *M. MUNDULA*.
 Panicle narrow but scarcely spikelike, the branches loosely flowered. Blades mostly in a short basal cluster; panicle 5 to 8 cm. long..... 44. *M. JONESII*.
 Blades not in a short basal cluster; panicle 10 to 30 cm. long..... 58. *M. DUBIA*.
 Blades flat, folded, or loosely involute. Panicle more or less spikelike. Glumes obtuse; culms delicate. Ligule about 2 mm. long..... 13. *M. FILIFORMIS*.
 Glumes acute or acuminate; culms wiry. Glumes gradually acute; culms minutely pubescent; ligule about 0.5 mm. long..... 24. *M. CUSPIDATA*.
 Glumes abruptly acute, usually awn-pointed or awned; culms hispidulous; ligule 1 to 3 mm. long..... 25. *M. WRIGHTII*.
 Panicle narrow, but not spikelike. Lemma villous below..... 67. *M. EMERSLEYI*.
 Lemma glabrous or obscurely pubescent.

- Lower sheaths compressed keeled..... 65. *M. LINDHEIMERI*.
 Lower sheaths not compressed keeled..... 64. *M. LONGILIGULA*.
 9b. Lemma with an awn usually more than 5 mm. long, or some of the awns less
 in *M. dubioides* and *M. metcalfei*.
 Old sheaths becoming flat and more or less coiled at base of plant.
 47. *M. VIRESCENS*.
 Old sheaths not flat and coiled.
 Panicle mostly 20 to 40 cm. long.
 Ligule 1 to 2 mm. long; glumes acute or awn-pointed.
 59. *M. DUBIOIDES*.
 Ligule 4 to 5 mm. long; glumes obtuse to subobtuse.
 57. *M. METCALFEI*.
 Panicle mostly 5 to 10 cm. long.
 10a. Lemma pilose or villous on lower part.
 Culms loosely tufted, hard and wiry at base.
 Glumes and floret about equal; lemma 2.5 to 3 mm. long, villous
 below..... 21. *M. POLYCAULIS*.
 Glumes about half as long as floret; lemma 4 to 5 mm. long, sparsely
 pilose..... 23. *M. ARSENEI*.
 Culms closely or somewhat loosely tufted, slender but not hard and
 wiry at base..... 48. *M. MONTICOLA*.
 10b. Lemma scaberulous, not pilose.
 Glumes less than 1 mm. long..... 49. *M. PARVIGLUMIS*.
 Glumes 2 to 4 mm. long..... 22. *M. PAUCIFLORA*.
 8b. Panicle open, or at least loose, the branches naked at base (sometimes shortly
 so in *M. metcalfei*).
 Plants widely spreading, much branched, wiry, the base knotty.
 51. *M. PORTERI*.
 Plants erect, not widely spreading and much branched.
 Blades flat, the midnerve and margins white-cartilaginous.
 52. *M. ARIZONICA*.
 Blades folded or involute, or occasionally some of them flat.
 Blades short in a basal cluster.
 Panicle mostly less than 15 cm. long; blades 1 to 3 cm. long, involute,
 curled or falcate..... 53. *M. TORREYI*.
 Panicle mostly more than 20 cm. long; blades commonly 5 to 8 cm. long,
 flat or usually folded..... 54. *M. ARENICOLA*.
 Blades elongate.
 11a. Panicle open or diffuse, if narrow, the branches slender; capillary,
 more or less flexuous.
 Awn of lemma less than 5 mm. long; panicle usually not more than
 twice as long as wide at maturity, the branches and pedicels stiff.
 Plants fibrous at the base; lemma awnless or with an awn to 2 mm.,
 rarely to 5 mm., long..... 60. *M. EXPANSA*.
 Plants not fibrous at base; lemma with an awn 2 to 5 mm. long.
 61. *M. REVERCHONI*.
 Awn of lemma usually more than 10 mm. long (sometimes awnless in
M. emersleyi); panicle elongate, usually at least 4 times as long as
 wide at maturity.
 Panicle diffuse, the branches more than 10 cm. long; pedicels usually
 much longer than the spikelets..... 62. *M. CAPILLARIS*.
 Panicle open but not diffuse.
 Panicle deep purple; blades relatively coarse, some of them usually
 flat..... 63. *M. RIGIDA*.
 Panicle pale or tawny; blades involute, scabrous.
 Ligule 4 to 10 mm. long; glumes obtuse to subacute.
 55. *M. SETIFOLIA*.
 Ligule 1 to 3 mm. long; glumes acute to mucronate.
 56. *M. XEROPHILA*.
 11b. Panicle narrow, elongate, the branches rather stiffly ascending or
 appressed.
 Lower sheaths rounded..... 57. *M. METCALFEI*.
 Lower sheaths compressed-keeled.
 Glumes as long as the floret; lemma villous below.
 67. *M. EMERSLEYI*.
 Glumes distinctly shorter than the floret; lemma pubescent on the
 margins toward the base..... 66. *M. INVOLUTA*.



FIGURE 520.—*Muhlenbergia wölfii*. Plant, $\times 1$; spikelet and floret, $\times 10$. (Hitchcock 7661, Mex.)

1. *Muhlenbergia wölfii* (Vasey) Rydb. (Fig. 520.) Annual; culms spreading, branching at base, 6 to 25 cm. tall; blades flat, mostly 1 to 3 cm. long, 1 mm. wide or less; panicle 2 to 6 cm. long, the simple branches ascending, the short, stiff pedicels appressed along the branches; spikelets 1 to 1.2 mm. long; glumes glabrous, about half as long as the spikelet; lemma rather turgid, minutely white-silky along the margins. ☉ (*Sporobolus ramulosus* of Manual, ed. 1.)—Open or wooded slopes, mostly in thin soil, Colorado to northern Mexico and Arizona.

2. *Muhlenbergia minutissima* (Steud.) Swallen. (Fig. 521.) Annual; culms erect to spreading, branching at base, 10 to 35 cm. tall; blades flat, mostly less than 10 cm. long, about 1 mm. wide; panicle half to three-fourths the length of the entire plant, the slender pedicels ascending; spikelets 1.2 to 1.5 mm. long, the glumes half to two-thirds as long, minutely pilose; lemma minutely silky-pubescent along the midnerve and margins. ☉ (*Sporobolus microspermus* of Manual, ed. 1.)—Moist sandy or rocky slopes, Montana to Washington south to Texas, California, and northern Mexico.

3. *Muhlenbergia fragilis* Swallen. (Fig. 522.) Annual; culms geniculate-ascending, freely branching at base, 10 to 30 cm. tall; blades flat, mostly 2 to 6 cm. long, 1 to 1.5 mm. wide; panicle very diffuse, the capillary branches, branchlets, and pedicels widely spreading or reflexed, fragile; spikelets 1 to 1.1 mm. long, the glumes half to two-thirds as long, glabrous; lemma silky-pubescent on the keel and margins, the palea silky-pubescent between the nerves. ☉ —Moist sandy soil and rocky hills, western Texas to southern Arizona, south to central Mexico.

4. *Muhlenbergia sinuosa* Swallen. (Fig. 523.) Annual; culms geniculate-ascending, freely branching at base; blades flat, mostly 4 to 10 cm. long, 1 to 1.5 mm. wide, minutely pubescent on both surfaces; panicle many-flowered, 14 to 22 cm. long, 2 to 6 cm. wide, the scabrous branches ascending, the elongate, capillary pedicels sinuous and tangled; spikelets often purple-tinged, 1.5 to 2 mm. long, the glumes about half as long, usually conspicuously pilose; lemma obtuse, delicately silky-pubescent below on the midnerve and margins, the broad palea equal. ☉ —Moist canyon walls and borders of marshes, New Mexico and Arizona.

5. *Muhlenbergia texana* Buckl. (Fig. 524.) Annual, culms delicate, erect or ascending, branching at base, 10 to 30 cm. tall, the culms strongly



FIGURE 521.—*Muhlenbergia minutissima*. Plant, $\times 1$; spikelet, floret, and ligule, $\times 10$. (Metcalfe 1431, N. Mex.)

unequal; foliage scant, ligule about 2 mm. long, erose, decurrent down the sheath; blades 2 to 5 cm. long, about 1 mm. wide; panicle half to two-thirds

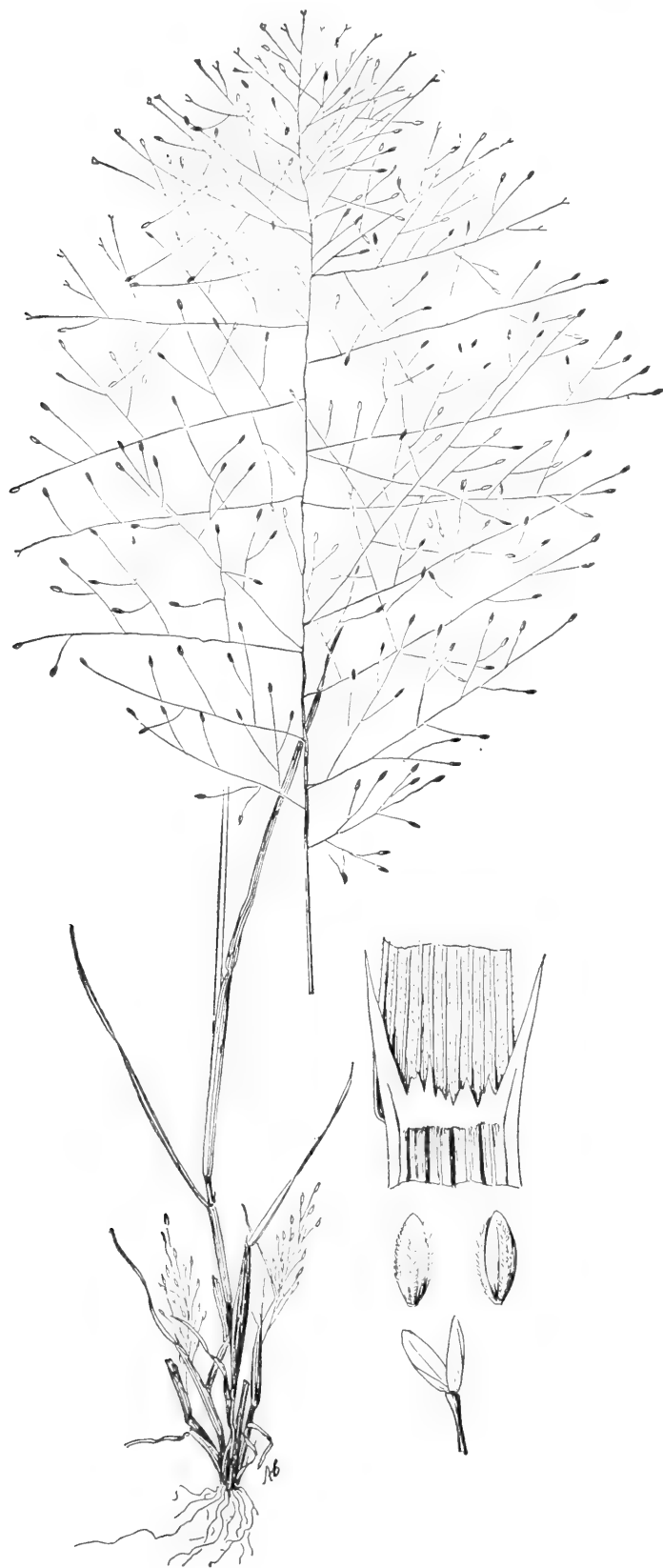


FIGURE 522.—*Muhlenbergia fragilis*. Plant, $\times 1$; glumes, two views of floret, and ligule, $\times 10$. (Type.)



FIGURE 523.—*Muhlenbergia sinuosa*. Plant, $\times 1$; spikelet and ligule, $\times 10$. (Type.)



FIGURE 524.—*Muhlenbergia texana*. Plant, $\times 1$; spikelet and floret, $\times 10$. (Wright 736, western Texas.)

the length of the plant, the delicate branches ascending or spreading; spikelets about 1.5 mm. long, on capillary mostly spreading pedicels 2 to 5 mm. long; glumes 1 and 1.5

mm. long, sparsely hirsute; lemma 1.6 to 1.8 mm. long, minutely silky on the nerves below, slightly notched and with a delicate awn 1 to 1.3 mm. long, the awns sometimes fallen in

overmature specimens. ☉ —Rocky canyons and slopes, western Texas to Arizona, northern Mexico, and Baja California; rare or overlooked.



FIGURE 525.—*Muhlenbergia eludens*. Plant, $\times 1$; glumes and floret, $\times 8$. (Pringle 399, Mex.)

6. *Muhlenbergia eludens* C. G. Reeder. (Fig. 525.) Annual, branching at base, culms slender, erect, 15 to 35 cm. tall, the culms strongly unequal; foliage scant, scabrous; ligule 2 to 2.5 mm. long; blades mostly 4 to 7 cm. long to 1.5 mm. wide, involute upward; panicle half to three-fourths the length of the plant, the slender branches relatively stiffly spreading; spikelets 2.2 to 2.5 mm. long, on short pedicels, mostly closely appressed to the branches; glumes about 1 to 1.5 mm. long, hirsute; lemma 2.3 mm. long, silky on the midnerve and margins, slightly notched and with an awn 2 to 2.5 mm. long. ☉ (Included in *M. texana* in Manual, ed. 1.)—Rocky woods and wet ledges and gravel bars, to 2,400 m. altitude, New

Mexico, Arizona, and northern Mexico.

7. *Muhlenbergia microspérma* (DC.) Kunth. LITTLESEED MUHLY. (Fig. 526.) Annual; culms densely tufted, branching and spreading at base, often purple, 10 to 30 cm. tall; blades mostly less than 3 cm. long, 1 to 2 mm. wide, scabrous; panicles narrow, 5 to 15 cm. long, the branches rather distant, ascending; spikelets on short thick pedicels; glumes broad, obtuse, subequal, less than 1 mm. long; lemma narrow, 2 to 4 mm. long, scabrous, the slender awn 1 to 3 cm. long. ☉ —Open dry ground, Nevada, Arizona, and southern California to Peru. Cleistogamous spikelets are developed at the base of lower sheaths, solitary or few in a fascicle in each axil, each spikelet included in an indurate thickened, tightly rolled narrowly conical reduced sheath, which readily disarticulates from the plant at maturity. The glumes are wanting and awn of lemma reduced, but the grain is larger than that of the spikelets in the terminal inflorescence, being about the same length (2 mm.) but much thicker.



FIGURE 526.—*Muhlenbergia microspérma*. Plant, $\times 1$; glumes and floret, $\times 10$. (Mearns 2780, Ariz.)

8. *Muhlenbergia appressa* C. O. Goodding. (Fig. 527.) Culms 10 to 40 cm. tall, erect or decumbent at base, much branched below; ligule lacerate, 2 to 3 mm. long; blades flat or folded, 1 to 4 cm. long, scabrous or puberulent; panicles numerous, as much as 20 cm. long, very narrow, loosely flowered, the branches appressed; glumes 1 to 2 mm. long or sometimes less, obtuse; lemma 4.5 to 6 mm. long, scabrous above, densely pilose on the callus and margins at the base; awn 10 to 30 mm. long. ☉ —Canyons and slopes, southern Arizona. Cleistogamous spikelets similar to those in *M. microsperma* are common in the lower reduced sheaths.



FIGURE 527.—*Muhlenbergia appressa*. Plant, $\times 1$; glumes and floret, $\times 10$. (Type.)

9. *Muhlenbergia pulcherrima* Scribn. (Fig. 528.) Culms 10 to 25 cm. tall, erect, freely branching at the base; sheaths scabrous, longer than the internodes; ligule thin, 2 to 3 mm. long; blades flat, pubescent on the upper surface, mostly less than 5 cm. long and 1 mm. wide; panicles 3 to 5 cm. long, the branches ascending or appressed; first glume 0.5 to 1 mm. long, acute or notched, the second 2 mm. long, 2- or 3-toothed; lemma 3 to 4 mm. long, narrow, acuminate, minutely bifid, scabrous, pubescent on the lower half of the margins; awn slender, flexuous, mostly 10 to 15 mm.

long, or sometimes only 5 mm. long. ☉ —Rocky ledges and open ground, Arizona (Apache County); Chihuahua, Mexico.



FIGURE 528.—*Muhlenbergia pulcherrima*. Plant, $\times 1$; glumes and floret, $\times 10$. (Schroeder, Ariz.)

10. *Muhlenbergia pectinata* C. O. Goodding. (Fig. 529.) Culms 10 to 25 cm. long, erect to decumbent, sometimes rooting at the lower nodes, freely branching, angular; sheath margins often ciliate; ligule erose to ciliate, about 0.5 mm. long; blades flat to involute, 1 to 6 cm. long, 1 to 2 mm. wide, pubescent or sparsely

pilose; panicles numerous, narrow, 2 to 12 cm. long; spikelets 3.5 to 4.5 mm. long; glumes abruptly acute or acuminate, commonly aristate, 1.5 to 2 mm. or sometimes 3 mm. long, the awn about half the entire length; lemma 3- to 5-nerved, scabrous to prominently ciliate on the lateral nerves, the callus appressed-pubescent; awn 10 to 30 mm. long. ☉ —Moist rocky hillsides, southern Arizona; Mexico.

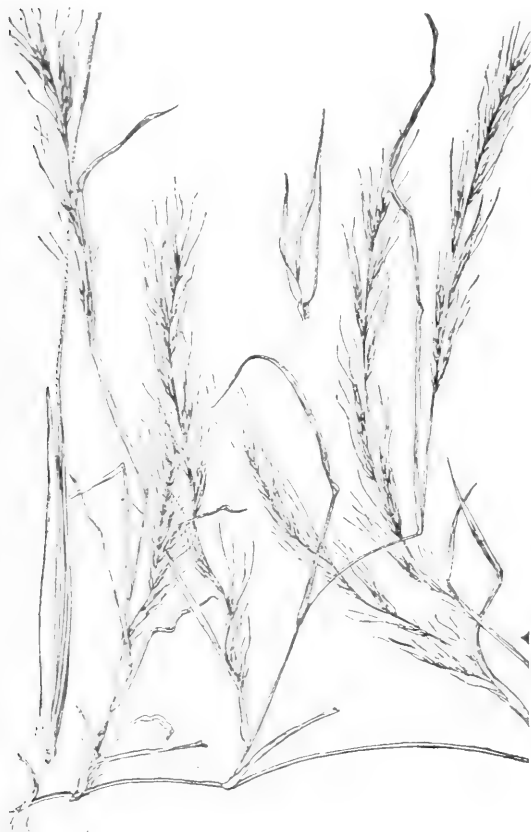


FIGURE 529.—*Muhlenbergia pectinata*. Plant, $\times 1$; glumes and floret, $\times 10$. (Type.)

11. *Muhlenbergia depauperata* Scribn. (Fig. 530.) Culms 2 to 15 cm. tall, densely tufted, erect, scabrous to hispidulous below the nodes; blades 1 to 1.5 cm. long (rarely 3 cm.), 1 to 1.5 mm. wide, scabrous, puberulent on the upper surface, with white cartilaginous midnerve and margins; panicles narrow, spikelike, often included, 1 to 4 cm. long (rarely to 6 cm.), the branches and pedicels closely appressed; glumes narrow, scabrous, about equal to or slightly

longer than the floret, the tips often spreading; first glume 2-nerved, bidentate or entire, 2.5 to 3.5 mm. long; second glume 1-nerved, acuminate-aristate, 3 to 4 mm. long; lemma 3 to 3.5 mm. long, prominently 3-nerved, scabrous above, sparsely pubescent on the internerves, the straight awn 2 to 10 mm. long, rarely less. ☉ —Open gravelly places, Arizona and New Mexico; northern Mexico.

12. *Muhlenbergia brévis* C. O. Goodding. (Fig. 531.) Culms 3 to 20 cm. tall, erect, tufted, much branched below; ligule 1 to 3 mm. long, lacerate; blades flat to involute, 0.5 to 4 cm. long, scabrous or puberulent above, scabrous below; panicles 1 to 2 cm. long, narrow, rather densely flowered, the branches erect; glumes scabrous, variable, shorter than the floret; first glume 1 to 3 mm. long, 2-nerved, minutely to deeply bifid; second glume 1.5 to 4 mm. long (usu-



FIGURE 530.—*Muhlenbergia depauperata*. Plant, $\times 1$; glumes and floret, $\times 10$. (Hitchcock 13560, N. Mex.)

ally 2 to 3 mm.), 1-nerved, acuminate; lemma 4 to 5 mm. long, 3- to 5-nerved, scabrous, especially on the nerves, sparsely to rather densely appressed-pubescent on the internerves toward the base; awn 10 to 20 mm. long (rarely less). ☉ (*M. depauperata* of Manual, ed. 1.)—Open ground at higher elevations, Colorado and Texas to Arizona; Mexico.

13. *Muhlenbergia filiformis* (Thurb.) Rydb. PULL-UP MUHLY. (Fig. 532.) Annual, or sometimes appearing perennial, loosely tufted, rather soft and lax, erect or somewhat spreading; culms filiform, usually 5 to 15 cm. tall, sometimes as much as 30 cm.; ligule about 2 mm. long; blades flat, usually less than 3 cm. long; panicle narrow, interrupted, few-flowered, usually less than 5 cm. long; glumes ovate, 1 mm. long; lemma lanceolate, acute, mucronate, 2 mm. long, minutely pubescent, scaberulous at tip. ☉ —Open woods and

mountain meadows, South Dakota and Kansas to British Columbia, south to New Mexico and California. A somewhat stouter form with thicker panicles has been differentiated as *M. simplex* Rydb.

14. *Muhlenbergia répens* (Presl) Hitchc. CREEPING MUHLY. (Fig. 533.) Perennial with widely creeping scaly rhizomes; culms decumbent, branching, spreading, the flowering branches 5 to 20 cm. long; blades mostly 1 to 3



FIGURE 531.—*Muhlenbergia brevis*. Plant, $\times 1$; glumes and floret, $\times 10$. (Type.)



FIGURE 532.—*Muhlenbergia filiformis*. Plant, $\times 1$; glumes and floret, $\times 10$. (Nelson 4011, Wyo.)

cm. long, flat or soon involute; panicle narrow, 1 to 4 cm. long, sometimes longer, interrupted; spikelets about 3 mm. long; glumes more than half as long as the lemma or a little more, acutish; lemma narrowed to a more or less apiculate summit, minutely roughened, usually darker than the glumes, the lateral nerves obscure. ☉ —Dry rocky or sandy open ground, Texas to Arizona; Mexico.

15. *Muhlenbergia utilis* (Torr.) Hitchc. APAREJO GRASS. (Fig. 534.) Similar to *M. repens*; usually more delicate and more widely spreading with finer leaves, the blades mostly 1 mm. wide or less; spikelets about 2 mm. long, less pointed, the glumes



FIGURE 533.—*Muhlenbergia repens*. Plant, $\times 1$; glumes and floret, $\times 10$. (Silveus 831, Tex.)

sometimes less than half as long as the paler lemma. 2 (Sporobolus utilis Scribn.)—Wet places, marshy soil, and along ditches and streams, Texas, southern California, Nevada, and Mexico. Used for stuffing pack saddles.

16. *Muhlenbergia richardsonis* (Trin.) Rydb. MAT MUHLY. (Fig. 535.) Perennial from numerous hard creeping rhizomes; culms wiry, nodulose-roughened, erect or decumbent at base, from 5 to 60 cm. tall; ligule 2 to 3 mm. long; blades usually involute, 1 to 5 cm. long, rarely longer; panicle narrow, interrupted, or sometimes rather close and spikelike, 2 to 10 cm. long; spikelets 2 to 3 mm.

long, the glumes about half as long, ovate; lemma lanceolate, acute, mucronate. 2 —Dry or moist open often alkaline soil, New Brunswick and Maine to Alberta, south to Michigan and Nebraska and in the mountains to New Mexico, through eastern Washington to California and Arizona; Baja California. There are two intergrading forms of this species; one with rather stout decumbent or somewhat spreading culms (*M. squarrosa* (Trin.) Rydb.), the other with slender erect culms (*M. richardsonis* (Trin.) Rydb.).

17. *Muhlenbergia villósa* Swallen. (Fig. 536.) Culms 10 to 20 cm. tall, wiry, freely branching, erect from creeping rhizomes, puberulent, obscurely nodulose; blades 2.5 to 3.5 cm. long, firm, involute, glabrous beneath, pubescent above; panicles 2 to 4 cm. long, the branches appressed or spreading, closely flowered; spikelets 2 to 2.5 mm. long, appressed; glumes subequal, 1 to 1.6 mm. long, acute or



FIGURE 534.—*Muhlenbergia utilis*. Plant, $\times 1$; glumes and floret, $\times 10$. (Lindheimer 559, Tex.)



FIGURE 535.—*Muhlenbergia richardsonis*. Plant, $\times \frac{1}{2}$; glumes and lemma, $\times 10$. (Jones 5743, Utah.)

subobtuse; lemma and palea villous on the lower half, the lemma acute or mucronate. ♀ —Known only from south of Stanton, Tex. The type of this species was previously referred to *M. thurberi* Rydb.

18. *Muhlenbergia thurberi* Rydb. (Fig. 537.) Perennial, with creeping rhizomes; culms slender, 10 to 20 cm. tall, branched at base, the branches erect, tufted, the tufts on branches of the rhizome; sheaths glabrous; blades involute, slender, mostly 1 to 3 cm. long; panicle pale, narrow, slender, 3 to 7 cm. long, the branches short, appressed, few-flowered; spikelets 3.5 to 4 mm. long; glumes nearly as long as the lemma, acute; lemma and palea villous on lower half, the lemma mucronate to short-awned. ♀ —Dry hills, New Mexico and Arizona; rare.

19. *Muhlenbergia curtifolia* Scribn. (Fig. 538.) Perennial, with creeping rhizomes; culms 10 to 20 cm. tall, loosely tufted, few from the branches of the rhizome; sheaths glabrous or pubescent; blades 1 to 2.5 cm. long, 2 to 3 mm. wide or less, rigidly spreading, pungently pointed, more or less pubescent; panicle 4 to 8 cm. long, slender, the branches appressed; spikelets 3 to 3.5 mm. long; glumes acute, a little shorter than the floret; lemma and palea villous on the lower half, scabrous above, tapering into an awn 1 to 4 mm. long. ♀ —Rocky soil, southern Utah, southern Nevada, and northern Arizona.

20. *Muhlenbergia glauca* (Nees) Mez. (Fig. 539.) Perennial, from a slender creeping branching woody rhizome; culms slender, wiry, erect

21. *Muhlenbergia polycaulis* Scribn.
(Fig. 540.) Perennial, from a firm crown; culms numerous, wiry, decumbent and scaly at base, 30 to



FIGURE 536.—*Muhlenbergia villosa*. Plant, $\times 1$; glumes and floret, $\times 10$. (Type.)

or ascending, 20 to 60 cm. tall, branching from the lower nodes; blades flat to subinvolute, mostly 5 to 10 cm. long, 1 to 2 mm. wide; panicle 5 to 12 cm. long, narrow, contracted, interrupted, the branches short, appressed; spikelets 3 to 4 mm. long, the glumes nearly as long, acuminate; lemma sparsely pilose on the lower part, acuminate into an awn usually 1 to 3 mm. (rarely as much as 8 mm.) long. 2 (*M. lemmoni* Scribn.)—Deserts, western Texas to southern California (Jamaica) and northern Mexico.



FIGURE 537.—*Muhlenbergia thurberi*. Plant, $\times 1$; glumes and floret, $\times 10$. (Standley 7345, Ariz.)



FIGURE 538.—*Muhlenbergia curtifolia*. Plant, $\times 1$; glumes and floret, $\times 10$. (Type.)



FIGURE 539.—*Muhlenbergia glauca*. Plant, $\times 1$; glumes and floret, $\times 10$. (Nealley 726, Tex.)



50 cm. tall; blades mostly flat and less than 5 cm. long, about 1 mm. wide; panicle narrow, contracted, interrupted, 3 to 8 cm. long; spikelets, excluding awns, 2.5 to 3 mm. long, the glumes a little shorter, tapering to slender awn tips; lemma and palea loosely villous below, the lemma tapering into a delicate awn 1 to 2 cm. long. 2 — Shaded ledges and grassy slopes, western Texas to southern Arizona and central Mexico.

22. *Muhlenbergia pauciflora* Buckl.
NEW MEXICAN MUHLY. (Fig. 541.) Perennial; culms loosely tufted, wiry, erect, branching at the lower nodes, 30 to 60 cm. tall; blades 1 mm. wide or less; panicle narrow, contracted, interrupted, 5 to 12 cm. long, the branches erect or ascending; spike-



FIGURE 540.—*Muhlenbergia polycaulis*. Plant, $\times 1$; glumes and floret, $\times 10$. (Type.)



FIGURE 541.—*Muhlenbergia pauciflora*. Plant, $\times 1$; glumes and floret, $\times 10$. (Wright 732, Tex.)

lets, excluding awn, about 4 mm. long, the glumes about half as long, acuminate to awn-tipped; lemma scaberulous only, tapering into a slender flexuous awn, 5 to 20 mm. long. 21 —Rocky hills and canyons, western Texas and Colorado, Utah, and Arizona, south to northern Mexico.

23. *Muhlenbergia arsénei* Hitchc. (Fig. 542.) Perennial, without rhizomes but the spreading base sometimes rhizomatous in appearance, loosely tufted; culms wiry, 10 to 45 cm. tall, branched below, the branches erect; leaves crowded toward the

base, the blades slender, involute, sharp-pointed, 1 to 3 cm. long; panicle narrow, rather loose, purplish, 2 to 10 cm. long, the branches ascending, floriferous from base; spikelets, excluding the awns, 4 to 5 mm. long, the glumes shorter, acute or subacute, awnless; lemma sparsely pubescent below, tapering into a flexuous awn 6 to 10 mm. long. 21 —Arid slopes, northern New Mexico and southeastern Utah; southern California (Clark Mountains).

24. *Muhlenbergia cuspidata* (Torr.) Rydb. PLAINS MUHLY. (Fig. 543.) Culms slender, wiry, 20 to 40 cm.

tall, erect, in dense tufts with hard bulblike scaly bases; ligule minute; blades flat or loosely involute, erect or ascending, 1 to 2 mm. wide; panicle narrow, somewhat spikelike, 5 to 10 cm. long, the short branches appressed; spikelets about 3 mm. long; glumes subequal, acuminate-cuspidate, about two-thirds as long as the spikelet; lemma acuminate-cuspidate, minutely pubescent. 2—Prairies and gravelly or stony slopes, Michigan and Wisconsin to Alberta, south to Ohio, Kentucky, and New Mexico.

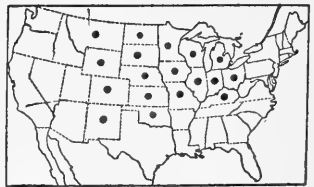
25. *Muhlenbergia wrightii* Vasey.
SPIKE MUHLY. (Fig. 544.) Culms closely tufted from a hard crown, erect, wiry, 20 to 60 cm. tall; sheaths compressed-keeled; ligule 1 to 3 mm. long, sometimes longer; blades flat, 1 to 3 mm. wide; panicle spikelike, interrupted below, 5 to 10 cm. long; spikelets about 2.5 mm. long, the



FIGURE 542.—*Muhlenbergia arseniei*. Plant, $\times 1$; glumes and floret, $\times 10$. (Type.)



FIGURE 543.—*Muhlenbergia cuspidata*. Plant, $\times 1$; glumes and floret, $\times 10$. (Crattv, Iowa.)



glumes rather thin, mostly about half as long as the spikelet, broad at base, tapering to an awn point; lemma glabrous, acuminate, awn-tipped. ♀ —Plains and open slopes at medium altitudes, Oklahoma, Colorado, Utah, New Mexico, Arizona, and northern Mexico.

26. *Muhlenbergia arenácea* Buckl. Hitchc. (Fig. 545.) Perennial, with creeping rhizomes; culms tufted from the branches of the rhizomes, sometimes decumbent at base, 10 to 35 cm. tall; ligule prominent, decurrent,

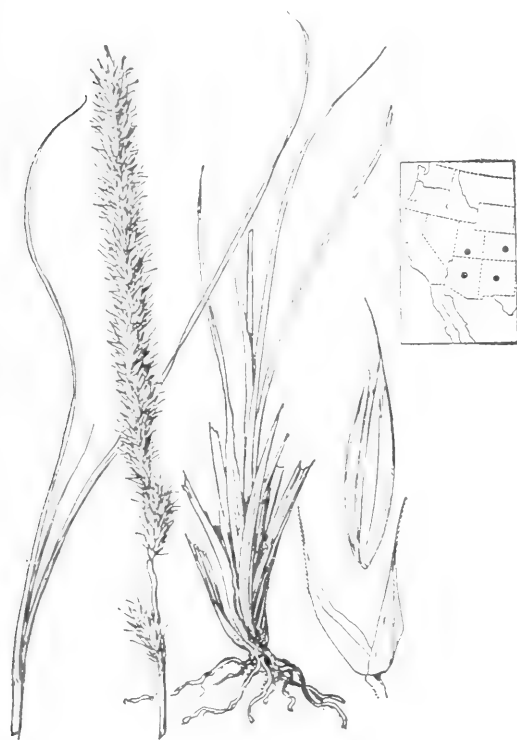


FIGURE 544.—*Muhlenbergia wrightii*. Plant, $\times 1$; glumes and floret, $\times 10$. (Standley 8249, N. Mex.)

1 to 2 mm. long, the margins usually split away, forming an erect auricle at each side; blades flat, wavy, mostly 1 to 3 cm. long, about 1 mm. wide, sharp-pointed, the margins and mid-nerve white and cartilaginous; panicle diffuse, 7 to 12 cm. long, about as broad, the branches and pedicels capillary; spikelets about 2 mm. long, rarely 2-flowered; the glumes about half as long, abruptly apiculate or subacute; lemma glabrous, abruptly mucronate. ♀ (*Sporobolus auriculatus* Vasey.)—Low places

in mesas, Texas and Colorado to Arizona and Sonora. This species and the next three are placed in *Muhlenbergia* because of the 3-nerved mucronate lemma. The caryopsis does not fall from the lemma and palea as in most species of *Sporobolus*, nor can the pericarp be separated from the grain by moistening it.

27. *Muhlenbergia asperifolia* (Nees and Mey.) Parodi. SCRATCHGRASS. (Fig. 546.) Perennial, pale or glaucous, with slender scaly rhizomes; culms branching at base, spreading, slender, compressed, 10 to 50 cm. tall, the branches ascending or erect; sheaths somewhat compressed-keeled, usually overlapping; ligule minute, erose-toothed; blades flat, crowded, scabrous, mostly 2 to 5 cm. long, 1 to 2 mm. wide; panicle diffuse, 5 to 15 cm. long, about as wide, the capillary scabrous branches finally widely spreading, the panicle at maturity breaking away; spikelets 1.5 to 2 mm. long, occasionally 2-flowered, the pedicels capillary; glumes acute, from half to nearly as long as the spikelet; lemma thin, broad, minutely mucronate from an obtuse apex. ♀ (*Sporobolus asperifolius* Nees and Mey.)—Damp or marshy, often alkaline soil, along irrigation ditches and banks of streams, New York, Indiana and Alberta to British Columbia, south to Texas, California, and Mexico; southern South America. The caryopsis is frequently affected by a fungus (*Tilletia asperifolia* Ell. and Everh.) which produces a large globular body.

28. *Muhlenbergia torreyana* (Schult.) Hitchc. (Fig. 547.) Perennial, strongly compressed at base, with short very scaly rhizomes; culms simple, or sparingly branching at base, erect, 30 to 60 cm. tall; blades elongate, rather firm, flat or folded, 1 to 3 mm. wide; panicle oblong, open, 10 to 20 cm. long, the capillary branches and pedicels ascending; spikelets about 2 mm. long, the glumes subequal, slightly shorter; lemma and palea minutely sca-

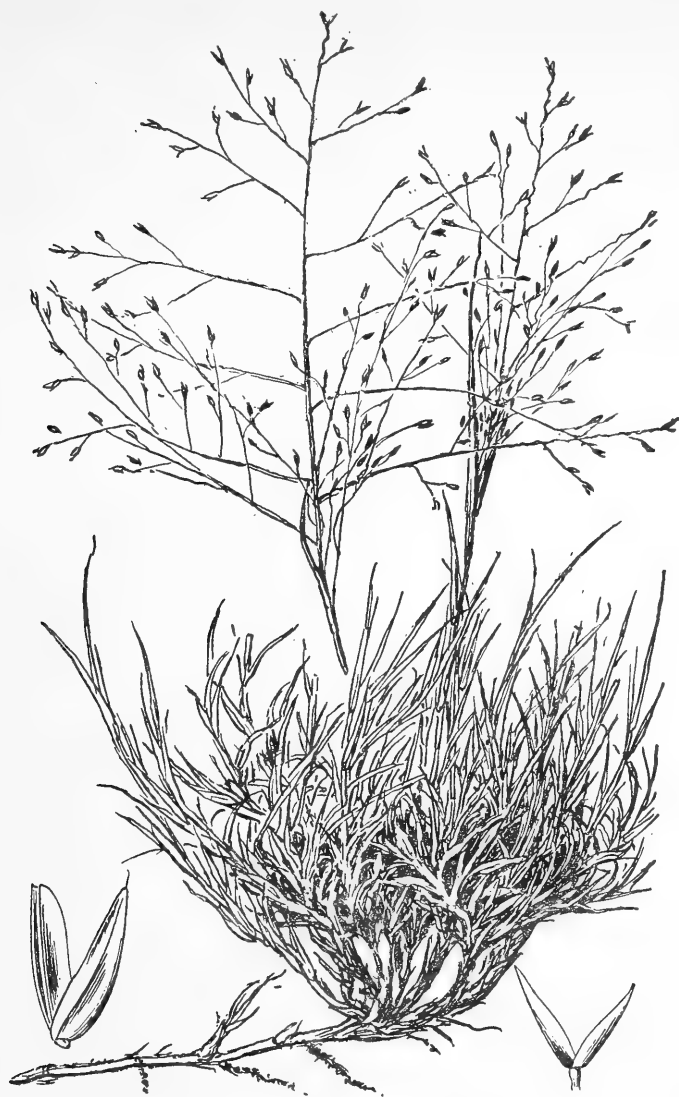


FIGURE 545.—*Muhlenbergia arenacea*. Plant, $\times 1$; glumes and floret, $\times 10$. (Tracy 7909, Tex.)

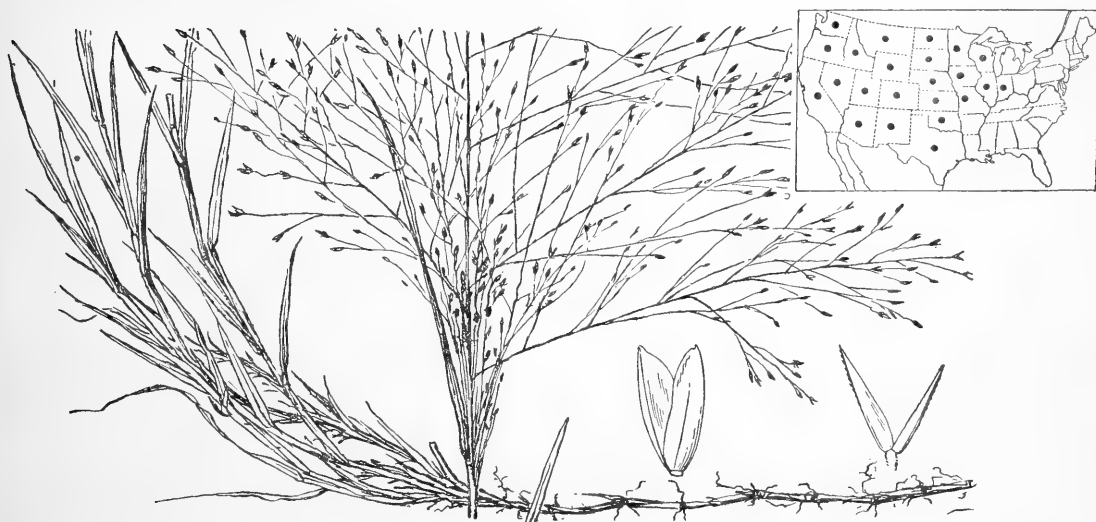


FIGURE 546.—*Muhlenbergia asperifolia*. Plant, $\times 1$; glumes and floret, $\times 10$. (Griffiths 212, S. Dak.)



FIGURE 547.—*Muhlenbergia torreyana*. Plant, $\times 1$; glumes and floret, $\times 10$. (Vasey, N. J.)

berulous-puberulent. 2 (*Sporobolus compressus* Kunth; *S. torreyanus* Nash.)—Moist pine barrens and meadows, New Jersey and Delaware; Georgia (Sumter County), Kentucky, and Tennessee.

29. *Muhlenbergia uniflora* (Muhl.) Fernald. (Fig. 548.) Perennial, but often appearing like an annual, tufted, often with decumbent bases; culms slender, erect, 20 to 40 cm. tall, the base and lower sheaths compressed; blades flat, crowded along the lower part of the culm, about 1 mm. wide; panicle loose, open, oblong, 7 to 20 cm. long, 2 to 4 cm. wide, the branches and pedicels capillary; spikelets dark purplish, about 1.5 mm. long, rarely 2-flowered; glumes scarcely half as long as the spikelet, subacute; lemma faintly 3-nerved, acutish. 2 (*Sporobolus serotinus* A. Gray; *S. uniflorus*

Scribn. and Merr.)—Bogs and wet meadows, Newfoundland to Michigan and New Jersey.

30. *Muhlenbergia dumosa* Scribn. (Fig. 549.) Perennial, with short, stout creeping scaly rhizomes; culms robust, solid, thick, and scaly at base (here as much as 6 mm. thick), the main culm erect or leaning, 1 to 3 m. tall, the lower part clothed with bladeless sheaths, freely branching at the middle and upper nodes, the branches numerous, fascicled, spreading, decompound, the ultimate branchlets filiform; blades



FIGURE 548.—*Muhlenbergia uniflora*. Plant, $\times 1$; glumes and floret, $\times 10$. (Chamberlain 147, Maine.)



FIGURE 549.—*Muhlenbergia dumosa*. Plant, $\times 1$; glumes and floret, $\times 10$. (Pringle, Ariz.)

flat or soon involute, smooth, those of the branches mostly less than 5 cm. long and 1 mm. wide; panicles numerous on the branches, commonly exceeded by the leaves, 1 to 3 cm. long, narrow, somewhat flexuous;

spikelets, excluding the awn, about 3 mm. long, the glumes scarcely half as long, thin, pale with a green mid-nerve, usually minutely awn-tipped or with an awn as much as 9 mm. long; lemma narrow, pubescent about the base and margin, pale with green nerves, the awn from the slightly notched apex, flexuous, 3 to 5 mm. long. 21 —Canyons and valley flats, southern Arizona to Jalisco, Mexico. Has the aspect of a miniature bamboo.

31. *Muhlenbergia andina* (Nutt.) Hitchc. FOXTAIL MUHLY. (Fig. 550.) Perennial, with numerous scaly rhizomes; culms erect or sometimes spreading, scabrous-puberulent below the nodes and the panicle, 50 to 100 cm. tall; sheaths smooth or slightly scabrous, keeled; ligule 1 mm. long, membranaceous, short-ciliate; blades flat, 2 to 6 mm. wide, scabrous; panicle narrow, spikelike, usually more or less lobed or interrupted, grayish, silky, often purple-tinged, 7 to 15 cm. long; glumes narrow, acuminate, ciliate-scabrous on the keels, 3 to 4 mm. long; lemma 3 mm. long, tapering into a capillary awn 4 to 8 mm. long, the hairs at base



FIGURE 550.—*Muhlenbergia andina*. Plant, $\times 1$; glumes and floret, $\times 10$. (Elmer 558, Wash.)



FIGURE 551.—*Muhlenbergia glomerata*. Plant, $\times 1$; glumes and floret, $\times 8$. (Macoun 26241, Ontario.)



FIGURE 552.—*Muhlenbergia racemosa*. Panicle, $\times 1$; glumes and floret, $\times 10$. (V. H. Chase 940, Ill.)

of floret copious, nearly as long as the body of the lemma. 21 (*M. comata* Benth.)—Meadows, moist thickets, gravelly river beds, and

open ground, at medium altitudes, Montana to eastern Washington, south to Kansas, New Mexico, and central California.

32. *Muhlenbergia glomerata* (Willd.) Trin. (Fig. 551.) Perennial from creeping branching scaly rhizomes; culms slender, erect or suberect, 30 to 90 cm. tall, simple or with a few erect branches at base, the internodes minutely puberulent; sheaths rounded on the back; ligule minute; blades flat, 5 to 15 cm. long, lax, 2 to 5 mm. wide, ascending; panicle narrow, compact, lobed, mostly interrupted at base, often purplish, 3 to 10 cm. long; spikelets 5 to 6 mm. long, the narrow, attenuate subequal glumes stiffly awn-tipped; lemma about 3 mm. long, pointed, pilose on the lower part. 21 — Sphagnum bogs, swamps, and moist ground, Newfoundland to British Columbia, Maine to Wisconsin, Virginia, and Indiana; Nebraska. Has been confused with *M. racemosa*; occasionally difficult to distinguish. Internodes are sometimes glabrous, but are roughish to the fingernail.

33. *Muhlenbergia racemosa* (Michx.) B. S. P. (Fig. 552.) Perennial from creeping scaly branching rhizomes, these and culms usually somewhat stouter than in the preceding; culms erect or ascending, subcompressed, 30 to 100 cm. tall, usually finally branching from the middle nodes, the branches mostly erect, the internodes smooth and shining except toward the summit; sheaths loose, keeled; ligule 1 to 1.5 mm. long; blades flat, 4 to 18 cm. long, 2 to 7 mm. wide, commonly somewhat firmer than those of *M. glomerata*, erect to ascending; panicle 3 to 14 cm. long, narrow, compact, often lobed, less commonly purple and thicker than in *M. glomerata*; spikelets 5 (rarely 4.5) to 7 mm. long, the narrow attenuate subequal glumes stiffly awn-tipped; lemma 2.5 to 3.5 mm. long, acuminate, rarely with a short awn, pilose on the lower part. 21 — Meadows, prairies, alluvial soil

along rivers, irrigation ditches, rocky slopes, dry ground and waste places, occasionally in wet meadows, swamps, and moist canyon bottoms, found in a wide range of habitats; Manitoba to Alberta; Michigan and Indiana to Washington, Oklahoma, and Arizona. Specimens from Orono, Maine, and Washington, D. C., were doubtless from cultivated plants.

34. *Muhlenbergia californica* Vasey. (Fig. 553.) Perennial, pale, leafy, the base more or less creeping and rhizomatous; culms ascending, somewhat woody below, 30 to 60 cm. tall, branching below; sheaths scaberulous; blades flat, 3 to 6 mm. wide, scabrous, usually short; panicle narrow, dense but interrupted, 7 to 15 cm. long; spikelets 3 to 4 mm. long, the glumes slightly shorter, scabrous, acuminate, awn-tipped; lemma scabrous, acuminate, awn-tipped, with sparse callus hairs about half as long as the lemma. 2—Stream borders and gullies, foothills and mountain slopes up to 2,000 m., confined to southern California.



FIGURE 553.—*Muhlenbergia californica*. Plant, $\times 1$; glumes and floret, $\times 10$. (Parish 2113, Calif.)

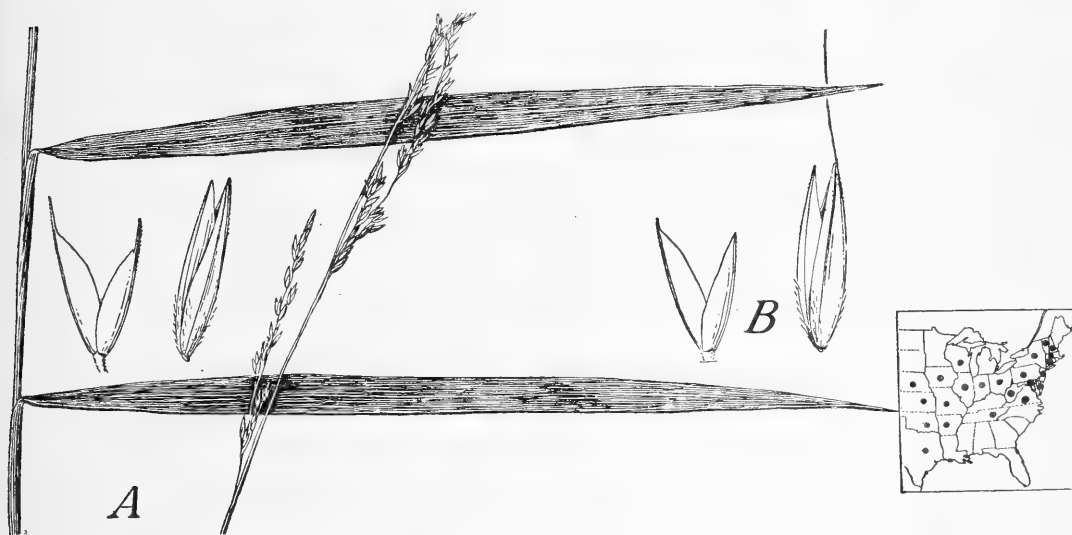


FIGURE 554.—A, *Muhlenbergia sobolifera*. Plant, $\times 1$; glumes and floret, $\times 10$. (Metcalf 1589, N. Y.) B, Var. *setigera*, $\times 10$. (Reverchon 1049, Tex.)

35. *Muhlenbergia sobolifera* (Muhl.) Trin. (Fig. 554, A.) Perennial, with numerous creeping scaly rhizomes 2 to 3 mm. thick; culms erect, slender, solitary or few in a tuft, glabrous, 60 to 100 cm. tall,

sparingly branching, the branches erect; blades flat, spreading, scabrous, those of the main culm 5 to 15 cm. long, 3 to 8 mm. wide, occasionally larger, at time of flowering aggregate along the middle part of

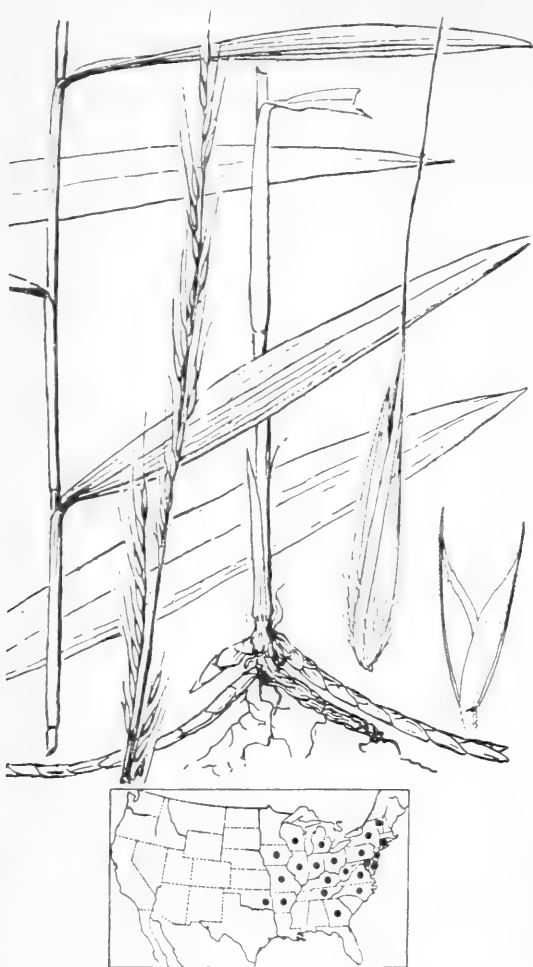


FIGURE 555.—*Muhlenbergia tenuiflora*. Plant, $\times 1$; glumes and floret, $\times 10$. (Mosley, Ohio.)

the culm; panicles slender, somewhat nodding, mostly 5 to 15 cm. long, the distant branches appressed, floriferous from base, overlapping or the lower more distant; spikelets mostly 2 to 2.5 mm. long, the glumes about two-thirds as long, abruptly acuminate or awn-tipped; lemma elliptic, bluntish, pubescent on the lower part, usually apiculate. $\text{\textcircled{2}}$ —Dry rocky woods and cliffs, New Hampshire to Nebraska, south to Virginia, Tennessee, and Texas.

MUHLENBERGIA SOBOLIFERA var. **SETIGERA** Scribn. (Fig. 554, B.) Branching more freely in the later stages; lemma with an awn 1 to 3 mm. long. $\text{\textcircled{2}}$ —Dry woods, Arkansas and Texas.

36. *Muhlenbergia tenuiflora* (Willd.) B. S. P. (Fig. 555.) Similar

to *M. sobolifera* in habit; culms often more robust; blades mostly 10 to 18 cm. long and 6 to 10 mm. wide; panicles on the average longer; culms retrorsely puberulent at least around the nodes; sheaths puberulent or scaberulous toward the summit; spikelets (excluding the awns) 3 to 4 mm. long, the glumes about half as long, broad at base, abruptly acuminate, scaberulous; lemma narrow, pubescent toward the base, tapering into a slender straight awn 3 to 10 mm. long. $\text{\textcircled{2}}$ —Rocky woods, Ontario and Vermont to Iowa, south to Georgia, Tennessee, and Oklahoma.

37. *Muhlenbergia brachyphylla* Bush. (Fig. 556.) Perennial, with numerous slender scaly rhizomes; culms slender, suberect, freely branching at the middle nodes, the branches lax, glabrous or obscurely scabrous below the nodes; blades flat, spreading, scaberulous, mostly 7 to 15 cm. long and 3 to 5 mm. wide; panicles on filiform peduncles, very slender, lax, relatively few-flowered, mostly 8 to 15 cm. long; spikelets, excluding the awn, about 3 mm. long, the glumes about two-thirds as long, awn-tipped; lemma minutely pubescent toward the base, tapering into a slender awn 3 to 6 mm. long, rarely shorter. $\text{\textcircled{2}}$ —Low woods, Maryland to North Carolina; Indiana and Wisconsin to Nebraska, south to Texas. Resembling *M. tenuiflora*, but with numerous filiform branches and more slender panicles.

38. *Muhlenbergia frondosa* (Poir.) Fernald. **WIRESTEM MUHLY.** (Fig. 557.) Perennial, with creeping scaly rhizomes; culms often relatively stout, glabrous below the nodes, finally decumbent, often rooting at the geniculate lower nodes, freely branching from all the nodes (occasionally simple below), the branches ascending or somewhat spreading, the plants becoming top-heavy and bushy, 40 to 100 cm. long; blades flat, scabrous, usually not more than 10 cm. long, sometimes as much as 15 cm., 3 to 7



FIGURE 556.—*Muhlenbergia brachyphylla*.
Plant, $\times 1$; glumes and florets, $\times 10$.
(V. H. Chase 3759, Ill.)

mm. wide; panicles numerous, short-exserted or partly included, terminal and axillary, the larger as much as 10 cm. long (the axillary shorter), narrow, sometimes rather loose, the branches ascending, mostly densely flowered from the base; glumes 2 to 3 mm., rarely to 4 mm., long, tapering into an awned tip, subequal or unequal, shorter than the floret, or the second glume exceeding it; lemma 2 to 3 mm. long, pointed, short-pilose at base. 21 (Described under *M. mexicana* in Manual, ed. 1.)—Thickets, low ground, and waste places, New Brunswick to North Dakota, south to Georgia and Texas.

MUHLENBERGIA FRONDOSA forma *COMMUTATA* (Scribn.) Fernald. Lemmas awned. 21 —Quebec and Maine to South Dakota, south to Virginia and Missouri. May be distinguished from the awned forms of *M. mexicana* by the culms smooth below the nodes.

39. *Muhlenbergia glabriflora* Scribn. (Fig. 558.) In habit resem-



FIGURE 557.—*Muhlenbergia frondosa*. Plant, $\times 1$;
glumes and floret, $\times 10$. (V. H. Chase 1166, Ill.)

bling *M. frondosa*, freely branching; culms scaberulous below the nodes as in *M. sylvatica*; blades numerous, short, narrow, appressed; panicles on the average shorter and narrower than in *M. frondosa*; spikelets about as in *M. frondosa* but the lemma glabrous. ♀ —Low woods, Maryland to North Carolina; Indiana to Missouri, Arkansas, and Texas.

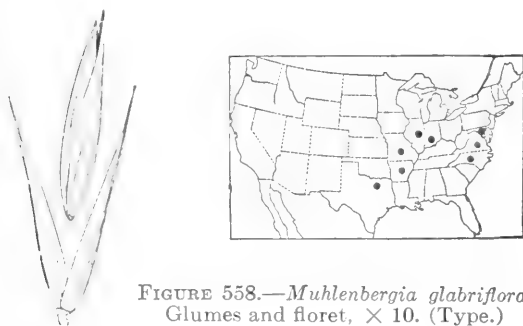


FIGURE 558.—*Muhlenbergia glabriflora*. Glumes and floret, $\times 10$. (Type.)

40. *Muhlenbergia sylvatica* (Torr.) Torr. (Fig. 559.) Perennial with creeping scaly rhizomes, culms slender, retrorsely scaberulous below the nodes, rather sparingly branching from the middle and upper nodes, finally leaning, the subfiliform branches often elongate, drooping, the plant 40 to 100 cm. tall; blades flat, lax, ascending to spreading, 0.5 to 18, commonly 8 to 15 cm., long, 2 to 8 mm. wide; panicles slender, nodding, the slender branches appressed, slightly overlapping; glumes lanceolate, acuminate or awn-tipped, 2 to 3 mm. long; lemma slightly exceeding the glumes, pilose below, tapering into a slender awn 5 to 10 mm. long. ♀ (*M. umbrosa* Scribn.)—Moist woods and thickets, Quebec and Maine to South Dakota, south to Alabama and Texas; Arizona.

MUHLENBERGIA SYLVATICA forma *ATTENUATA* (Scribn.) Palmer and Steyermark. Lemmas short-awned or nearly awnless. ♀ —Ontario, Maine, Connecticut, Indiana, Illinois, Michigan, South Dakota, Missouri, District of Columbia, and Oklahoma.

MUHLENBERGIA SYLVATICA var. *ROBUSTA* Fernald. Culm stiffer, blades somewhat firmer, some of them 7 to

10 mm. wide; panicles with more densely flowered branches; glumes slightly broader. ♀ —Maine, Connecticut, New York, New Jersey, and Indiana.

41. *Muhlenbergia mexicana* (L.) Trin. (Fig. 560.) Resembling *M. frondosa*, the culms erect or ascending, usually simple below, less freely branching, scaberulous below the nodes; blades lax, often 10 to 20 cm. long, mostly 2 to 4 mm. wide; panicles mostly long-exserted, narrow, the upper often 10 to 15 cm. long, of numerous short appressed densely flowered somewhat aggregate branches; spikelets 2 to 3 mm. long, glumes narrow, attenuate, awn-



FIGURE 559.—*Muhlenbergia sylvatica*. Plant, $\times 1$; glumes and floret, $\times 10$. (Conant, Mass.)



FIGURE 560.—*Muhlenbergia mexicana*. Plant, $\times 1$; glumes and floret, $\times 10$. (Deam 19225, Ind.)

tipped, about equaling the pointed or awn-tipped lemma, the lemma long-pilose below. 2 (Described under *M. foliosa* in Manual, ed. 1. The name *M. mexicana* had long been misapplied to the recently recognized *M. frondosa* (Poir.) Fernald.)—Moist thickets, low woods, and low open ground, Quebec and Maine to British Columbia and Washington, south to North Carolina, New Mexico, and California.

MUHLENBERGIA MEXICANA forma **AMBÍGUA** (Torr.) Fernald. Lemmas with an awn 4 to 10 mm. long. 2 —Range of the species to North Dakota; intergrading with forma *setiglumis* in Indiana and westward.

MUHLENBERGIA MEXICANA forma **SETIGLÚMIS** (S. Wats.) Fernald. 2 —Glumes with an awn 1 to 2 mm. long; lemma awned as in the preceding, the two scarcely distinct. 2 —Iowa and South Dakota to Washington, south to New Mexico and California.

42. Muhlenbergia schrebéri Gmel. **NIMBLEWILL**. (Fig. 561.) Culms slender, branching, spreading and decumbent at base, usually rooting at the lower nodes, but not forming definite creeping rhizomes, the flowering branches ascending, 10 to 30 cm. long; blades flat, mostly less than 5 cm. long, and 2 to 4 mm. wide; panicles terminal and axillary, slender, loosely flowered, lax, nodding, 5 to 15 cm. long; glumes minute, the first often

obsolete, the second rounded, 0.1 to 0.2 mm. long; lemma narrow, somewhat pubescent around the base, the body about 2 mm. long, the slender awn 2 to 5 mm. long. 2 —Damp shady places, New Hampshire to Wisconsin and eastern Nebraska, south to Florida and Texas; eastern Mexico. In spring and early summer the culms are short and erect with spreading blades, the plants being very different in appearance from the flowering phase of fall. **MUHLENBERGIA SCHREBERI** var. **PALÚSTRIS** (Scribn.) Scribn. Glumes developed as much as 1 mm. long. 2 —Washington, D. C.; Bull Run Mountains, Va.

43. Muhlenbergia curtisetósa (Scribn.) Bush. (Fig. 562.) A little-known form, differing from *M. schreberi* in having stouter culms, coarser panicles, the glumes evident, rarely as much as 2 mm. long, the lemma 2.5 to 3 mm. long, the awn 1 to 2 mm. long. 2 —Delaware County, Pa., Illinois (Clinton), Missouri (Eagle Rock).

44. Muhlenbergia jonésii (Vasey) Hitchc. (Fig. 563.) Perennial, closely tufted; culms erect, 20 to 40 cm. tall; leaves mostly basal, the numerous lower sheaths finally flattened and loose; ligule 2 to 4 mm. long; blades subfiliform, involute, scabrous; panicle narrow, 5 to 15 cm. long, the branches ascending, rather loosely flowered; spikelets 3 to 4 mm. long; glumes broad, scabrous-puberulent,

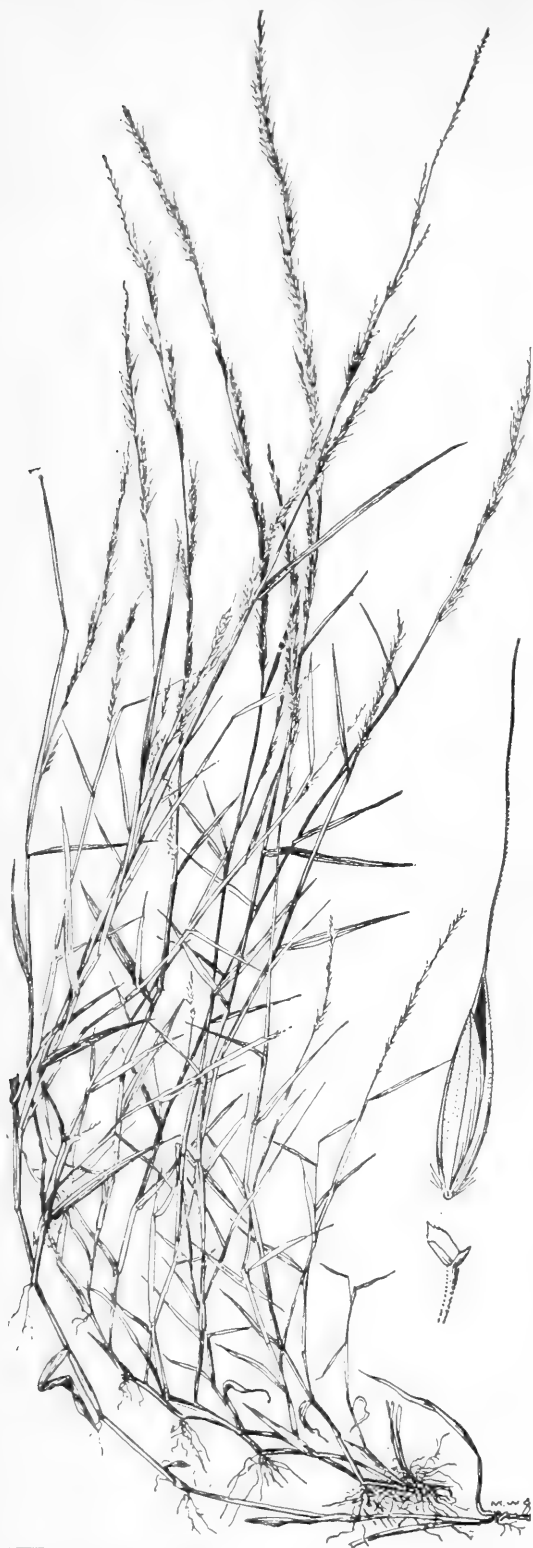


FIGURE 561.—*Muhlenbergia schreberi*. Plant, $\times \frac{1}{2}$; glumes and floret, $\times 10$. (Curtiss 3400, Tenn.)



about one-third as long as the spikelet, obtuse, often erose; lemma obscurely pubescent below, tapering to an acuminate or awned tip. 2 — Open ground, northeastern California.



FIGURE 562.—*Muhlenbergia curtisetosa*. Glumes and floret, $\times 10$. (Wolf 30, Ill.)



FIGURE 563.—*Muhlenbergia jonesii*. Plant, $\times 1$; glumes and floret, $\times 10$. (Austin 1230, Calif.)

45. *Muhlenbergia montana* (Nutt.) Hitchc. MOUNTAIN MUHLY. (Fig. 564.) Perennial; culms densely tufted, erect, 15 to 60 cm. tall; sheaths glabrous, mostly basal, becoming flat and loose; blades flat to involute, 1 to 2 mm. wide; panicle narrow, rather



FIGURE 564.—*Muhlenbergia montana*. Plant, \times 1; glumes and floret, \times 10. (Patterson 156, Colo.)

loose, 5 to 15 cm. long, the branches ascending or appressed, floriferous from base; first glume acute, 1.5 mm. long, the second longer, broader, 3-nerved, 3-toothed; lemma 3 to 4 mm. long, pilose below, scaberulous above, the awn slender, flexuous, 1 to 1.5 cm. long, sometimes shorter. 2l (*M. trifida* Hack., *M. gracilis* of authors, not Kunth.)—Canyons, mesas, and rocky hills, 2,000 to 3,000 m., Montana to Utah and central California, south to western Texas and southern Mexico.

46. *Muhlenbergia filiculmis* Vasey. SLIMSTEM MUHLY. (Fig. 565.) Culms

densely tufted, erect, filiform, 10 to 20 cm. tall, the leaves in a short basal cluster; ligule prominent; blades involute, filiform, mostly less than 5 cm. long; panicle slender, the branches erect, mostly 2 to 5 cm. long, sometimes as much as 10 cm.; spikelets about 2.5 to 3 mm. long, the glumes about half as long, awn-tipped, the first rather narrow, acuminate, the second broader, 3-nerved, sharply 3-toothed, rarely entire or erose only; lemma pubescent on the lower half, tapering to an awned tip, or rarely with an awn as much as 4 mm. long. 2l —Open sandy or



FIGURE 565.—*Muhlenbergia filiculmis*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Type.)

rocky soil, 2,000 to 3,000 m. altitude, Wyoming, Colorado, New Mexico, and Utah.

47. *Muhlenbergia virescens* (H. B. K.) Kunth. SCREWLEAF MUHLY. (Fig. 566.) Perennial; culms densely tufted, erect, 40 to 60 cm. tall, the old basal sheaths flattened and more or less coiled; ligule, except the margin, delicate, 3 to 10 mm. long; blades flat or those of the innovations involute, mostly elongate and flexuous; panicle narrow but rather loose, 5 to 15 cm. long, the branches erect; spikelets, excluding awns, about 5 mm. long, the glumes slightly shorter, acute, the second 3-nerved; lemma and palea pubescent on the lower half, the lemma tapering into a slender flexuous awn 1 to 2 cm. long. 2 —Canyons, rocky hills, and mesas, New Mexico and Arizona to central Mexico.

48. *Muhlenbergia monticola* Buckl. MESA MUHLY. (Fig. 567.) Perennial; culms tufted, slender, erect or decumbent at base, 30 to 50 cm. tall, branching at the lower and middle nodes, leafy throughout; blades 3 to 7 cm. long, narrow, flat, or soon involute; panicle soft, narrow, contracted, 5 to 10, sometimes to 20 cm. long, the branches appressed or slightly spreading; spikelets, excluding awns, about 3 mm. long, the glumes about two-thirds as long, subacute to obtuse and erose at tip; lemma pubescent at base and on lower half of margin, tapering into a delicate flexuous awn 1 to 2 cm. long. 2 —Rocky hills and canyons, western Texas to Arizona and central Mexico.

49. *Muhlenbergia parviglumis* Vasey. (Fig. 568.) Perennial, with the habit of *M. monticola*; blades on the average somewhat longer, 1 to 3 mm. wide; panicle looser, the branches filiform, longer; glumes minute, erose, subacute to truncate; lemma scaberulous only, tapering in-



FIGURE 566.—*Muhlenbergia virescens*. Plant, $\times 1$; glumes and floret, $\times 10$. (Palmer 565, Ariz.)



FIGURE 567.—*Muhlenbergia monticola*. Plant, $\times 1$; glumes and floret, $\times 10$. (Nealley 399, Tex.)



FIGURE 568.—*Muhlenbergia parviglumis*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Vasey, Tex.)

to a delicate awn 2 to 3 cm. long. 2 —Canyons, Texas, New Mexico, and northern Mexico; Cuba.

50. *Muhlenbergia pungens* Thurb. (Fig. 569.) Perennial, with strong creeping rhizomes; culms tufted, erect from a decumbent leafy base, 20 to 40 cm. tall, sometimes taller; blades short, involute, sharp-pointed; panicle long-exserted, open, oblong, 5 to 15 cm. long; the main branches 3 to 5, these dividing into fascicles of capillary finally spreading or divaricate very scabrous branchlets; spikelets purple to brownish, 4 to 5 mm. long, the glumes about one-third as long, scabrous, often erose or toothed, the midnerve extending into a short awn; lemma terete, tapering into an awn about 1 mm. long; palea about as long as the lemma, the keels awn-tipped. 2 — Dry hills and sandy plains, South Dakota and Nebraska to Wyoming,

New Mexico, and Arizona.

51. *Muhlenbergia porteri* Scribn. BUSH MUHLY. (Fig. 570.) Perennial; culms woody or persistent at base, numerous, wiry, widely spreading or ascending through bushes, scaberulous, mostly branching from all the nodes, 30 to 100 cm. tall or more; sheaths smooth, spreading away from the branches, the prophylla conspicuous; blades mostly about 1 mm. wide, flat, 2 to 8 cm. long, early deciduous from the sheaths; panicle 5 to 10 cm. long, open, the slender branches and branchlets brittle, widely spreading, bearing rather few long-pediceled spikelets; glumes narrow, acuminate, slightly unequal, the second about 2 mm. long; lemma purple, acuminate, sparsely pubescent, 3 to 4 mm. long, with a delicate awn 5 to 12 mm. long. 2 — Dry mesas and hills, canyons, and rocky deserts, western Texas to Colorado,



FIGURE 569.—*Muhlenbergia pungens*. Plant, $\times 1$; glumes and floret, $\times 10$. (Jones 6046, Utah.)

Nevada, and southern California, south to northern Mexico. Known also as mesquite 'grass and black grama.

52. *Muhlenbergia arizónica* Scribn. (Fig. 571.) Perennial, in close tufts; culms slender, erect or decumbent at base, 15 to 40 cm. tall; sheaths keeled; ligule thin, 1 to 2 mm. long, decurrent; blades flat or folded, mostly less than 5 cm. long, 1 to 2 mm. wide, the margins and mid-nerve white, cartilaginous; panicle open, 5 to 12 cm. long, 4 to 8 cm. wide, the branches capillary, compound; spikelets long-pedicellate, about 3 mm. long, the glumes about one-third as long, ovate, subacute; lemma narrowly lanceolate, minutely pubescent along the midnerve and margins below, the awn about 1 mm. long, from a minutely notched apex. 24 —Stony hills, southern Arizona and northwestern Mexico.

53. *Muhlenbergia torréyi* (Kunth) Hitchc. ex Bush. RINGGRASS. (Fig. 572.) Perennial in loose tufts, with numerous innovations, the base decumbent or forming short rhizomes, the plants usually gregarious, sometimes forming large patches or "fairy rings"; culms slender, 10 to 30 cm. tall; leaves in a short basal cluster; blades closely involute, usually 2 to 3 cm. long, falcate or flexuous, forming a crisp curly cushion; panicle open, usually about half the entire length of the culm, commonly purple, the capillary branches finally spreading, the pedicels mostly as long as the spikelets or longer; spikelets about 3 mm. long, the glumes, including the awn-tip, about two-thirds as long; lemma nearly glabrous, tapering into a delicate awn about 3 mm. long. 24 (*M. gracillima* Torr.)—Plains, mesas, and dry hills, western Kansas and Wyoming to Texas and Arizona.

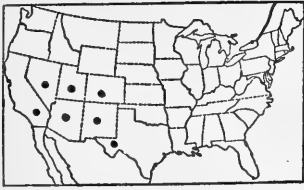


FIGURE 570.—*Muhlenbergia porteri*.
Plant, $\times 1$; glumes and floret, $\times 10$. (Chase 5887, Tex.)

54. *Muhlenbergia arenicola* Buckl. (Fig. 573.) Resembling *M. torreyi*; culms mostly 30 to 50 cm. tall; blades usually straight and on the average longer; panicle larger, mostly pale, the branchlets and pedicels appressed; spikelets slightly longer, the lemma scabrous, the awn 1 to 2 mm. long. ♀ —Sandy plains and mesas, western Kansas to Arizona, south to northern Mexico.

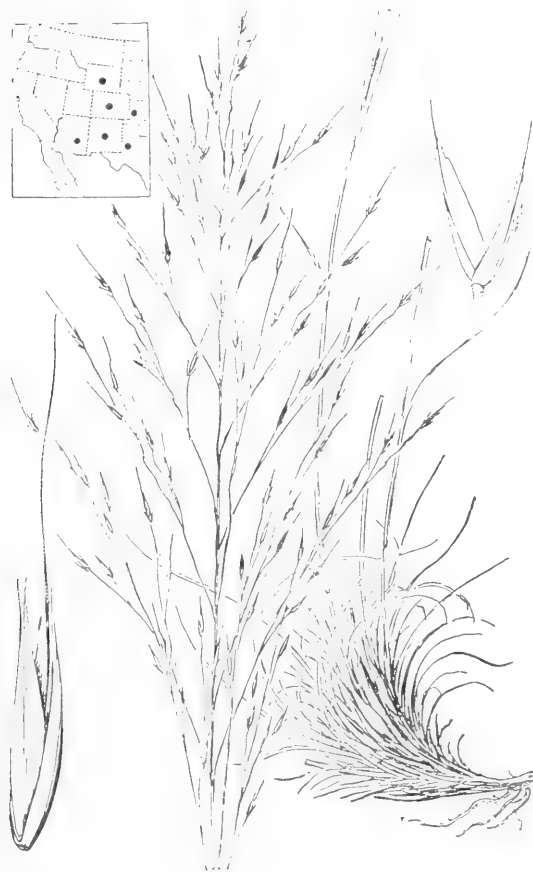
55. *Muhlenbergia setifolia* Vasey. (Fig. 574.) Perennial, tufted; culms erect, hard, wiry, 50 to 80 cm. tall; sheaths with erect auricles, 2 to 10 mm. long; blades involute, fine, scarcely 0.5 mm. thick, very scabrous, flexuous, as much as 20 cm.

long; panicle narrow, open, 10 to 30 cm. long, the capillary branches ascending, flexuous; spikelets, excluding awns, about 5 mm. long, the glumes one-third to half as long, obtuse to subacute; lemma hairy on the callus, otherwise smooth, tapering into a flexuous awn 1.5 to 2 cm. long. ♀ —Rocky hills, western Texas and northern Mexico.

56. *Muhlenbergia xerophila* C. O. Goodding. (Fig. 575.) Culms 45 to 90 cm. tall, densely tufted, glabrous or scaberulous; sheaths scaberulous; ligule 2 to 4 mm. long, obtuse; blades involute, 15 to 50 cm. long, 1 to 1.5 mm. wide; panicle open (contracted at maturity), 15 to 35 cm. long, with cap-



FIGURE 571.—*Muhlenbergia arizonica*. Plant, $\times 1$; glumes and floret, $\times 10$. (Griffiths 3368, Ariz.)



illary, flexuous, spreading branches; spikelets about 4 mm. long; glumes equal or subequal, 2 to 2.5 mm. or sometimes as much as 3 mm. long, acute or acuminate, scabrous or pubescent; lemma 4 mm. long, scabrous, the callus appressed-pilose, the hairs about 1 mm. long, the delicate capillary awn 10 to 35 mm. long. ♀ —Canyons and rocky slopes, southern Arizona.

57. *Muhlenbergia metcálfei* Jones. (Fig. 576.) Perennial, in close tufts; culms erect, 50 to 80 cm. tall; ligule 3 to 15 mm. long, sometimes longer; blades involute, slender, flexuous, scabrous, sometimes only slightly so, not crowded at base; panicle narrow but somewhat loose, pale or slightly purplish, 15 to 40 cm. long, the branches usually naked at base; spikelets tapering to summit, about 4 mm. long; glumes nearly equal, obtuse, a little less than half as long as spikelet; lemma scaberulous toward summit, the awn 3 to 10 mm. long. ♀ —Rocky hills, Texas and New Mexico.

58. *Muhlenbergia dúbia* Fourn. PINE MUHLY. (Fig. 577.) Perennial, closely tufted; culms erect, hard and wiry at base, 30 to 100 cm. tall; sheaths with erect firm auricles, 4 to 10 mm. long, rarely longer; blades involute, scabrous; panicle narrow, sometimes almost spikelike, grayish, 10 to 30 cm. long, rarely longer; spikelets about 4 mm. long; glumes about half as long as the spikelet, minutely scaberulous, obtuse; lemma minutely scaberulous, with an awn as much as 4 mm. long, rarely acuminate only. ♀ (*M. acuminata* Vasey; *Sporobolus ligulatus* Vasey and Dewey.)—Canyons and rocky hills, up to 7,000 feet elevation, western Texas, New Mexico, and northern Mexico.

59. *Muhlenbergia dubioídes* C. O. Goodding. (Fig. 578.) Culms 50 to 100 cm. tall, densely tufted, erect;

FIGURE 572.—*Muhlenbergia torreyi*. Plant, $\times 1$; glumes and floret, $\times 10$. (Chase 5298, Colo.)



FIGURE 573.—*Muhlenbergia arenicola*.
Plant, $\times 1$; glumes and floret, $\times 10$.
(Hitchcock 13602, Tex.)

ligule truncate, 1 to 2 mm. long; blades 15 to 50 cm. long, 1 to 2 mm. wide, involute, glabrous, or scaberulous below; panicle 15 to 35 cm. long, 2 to 4 cm. wide, densely flowered, the branches appressed; spikelets about 4 mm. long; glumes subequal, 2 to 3 mm. long, acute, more or less erose, scaberulous; lemma 3.5 to 4 mm. long, the callus appressed-pilose with hairs 1 to 1.5 mm. long; awn straight, scabrous, 3 to 10 mm. long. ♀ —Canyons and rocky slopes, Santa Cruz and Pima Counties, southern Arizona.

60. *Muhlenbergia expansa* (DC.) Trin. (Fig. 579.) Resembling *M. capillaris*, in denser tufts, the old basal sheaths forming a curly fibrous mass; blades narrow, flat, becoming involute; panicle relatively smaller, narrower, the capillary branches and branchlets mostly straight; spikelets 3.5 to 5 mm. long, the glumes one-third to two-thirds as long, acute to

acuminate; lemma scaberulous, nearly glabrous at base, awnless or with an awn 2 to 3 mm. long, rarely longer. ♀ (*M. trichopodes* Chapm.)—Moist pine barrens near the coast, Virginia to Florida and Texas.

61. *Muhlenbergia reverchóni* Vasey and Scribn. (Fig. 580.) Resembling *M. expansa*, culms more slender, foliage finer; glumes less than half as long as the lemma, subacute or erose; lemma with an awn 2 to 5 mm. long. ♀ —Rocky prairies, Texas and Oklahoma.

62. *Muhlenbergia capillaris* (Lam.) Trin. (Fig. 581.) Perennial, in tufts; culms rather slender, erect, 60 to 100 cm. tall; sheaths scaberulous, at least toward the summit, and with auricles mostly 3 to 5 mm. long; blades elongate, flat or involute, 1 to 4 mm. wide, those of the innovations narrower, involute; panicle purple, oblong, diffuse, one-third to half the entire height of the culm, the branches capillary, flex-



FIGURE 574.—*Muhlenbergia setifolia*. Plant, $\times 1$; glumes and floret, $\times 10$. (Hitchcock 13507, N. Mex.)

uous, the branchlets and pedicels finally spreading; spikelets, excluding awns, 3 to 4 mm. long, the glumes one-fourth to two-thirds as long, acute, the second often short-awned; lemma scaberulous, minutely hairy on the callus and with a delicate awn 5 to 15 mm. long. 2 —Rocky or sandy woods, Massachusetts to Indiana and Kansas, south to Florida and Texas; West Indies, eastern Mexico.

MUHLENBERGIA CAPILLARIS var. *FÍLIPES* (M. A. Curtis) Chapm. ex Beal. Culms stouter; blades mostly involute; glumes with delicate awns, mostly longer than the lemma; lemma with a delicate setaceous tooth each side of the awn. 2 (*M. filipes* M. A. Curtis.)—Moist pine barrens near

the coast, North Carolina, Florida, Mississippi, and Texas.

63. *Muhlenbergia rígida* (H. B. K.) Kunth. PURPLE MUHLY. (Fig. 582.) Perennial, densely tufted; culms erect, 60 to 100 cm. tall; leaves crowded at base, old sheaths persistent, the sheaths with auricles 2 to 5 mm., rarely longer; blades flat or soon involute, flexuous, those of the innovations involute; panicle dark purple, narrow, finally loose and open, 15 to 30 cm. long, the capillary branches ascending, the lower as much as 10 cm. long; spikelets, excluding awns, about 4 mm. long, the glumes from minute to about one-fourth as long, acute to erose-obtuse; lemma strongly nerved, hairy on the callus and with a



FIGURE 575.—*Muhlenbergia xerophila*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Silveus 3477, Ariz.)



FIGURE 576.—*Muhlenbergia metcalfei*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Metcalf, N. Mex.)

somewhat loose, erect, 20 to 40 cm. long, the branches ascending or appressed; spikelets 2 to 3 mm. long; glumes subequal, acutish, usually glabrous; lemma usually about as long as the glumes, glabrous, awnless, rarely with a minute awn. 2 (*Epi-*



FIGURE 577.—*Muhlenbergia dubia*. Plant, $\times 1$; glumes and floret, $\times 10$. (Hitchcock 3775, N. Mex.)



FIGURE 578.—*Muhlenbergia dubioides*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Type.)

flexuous awn 1 to 1.5 cm. long. 2 (*M. berlandieri* Trin.)—Rocky or gravelly soil, Texas to Arizona and northern Mexico.

64. *Muhlenbergia longiligula* Hitchc. (Fig. 583.) Culms erect, about 1 m. tall, the base hard, wiry, cylindric, the lower sheaths expanded; ligule (or auricle of sheath) firm, usually about 1 cm. long; blades as much as 50 cm. long, 2 to 5 mm. wide, flat to subinvolute, very scabrous, usually drying involute; panicle narrow,



FIGURE 579.—*Muhlenbergia expansa*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Tracy 3701, Miss.)

1.5 m. tall, the numerous overlapping lower sheaths keeled; ligule rather thin, elongate, mostly hidden in the folded base of the blade; blades elongate, firm, flat or usually folded, about 3 mm. wide, scaberulous or glabrous; panicle narrow, pale, somewhat loose, erect, 20 to 40 cm. long, the branches ascending or appressed; spikelets 2.5 to 3 mm. long; glumes acute to rather obtuse, scabrous-puberulent; lemma a little shorter to a little longer than the glumes, 3-nerved, glabrous or obscurely pubescent, awnless or rarely with an awn as much as 3 mm. long. 2 —Rocky slopes, Texas.

66. *Muhlenbergia involuta* Swallen. (Fig. 585.) Culms erect, densely tufted, 60 to 135 cm. tall; sheaths compressed-keeled, scabrous; ligule about 10 mm. long; blades elongate, involute, wiry, scabrous; panicle erect, narrow, 30 to 40 cm. long, the subcapillary branches ascending or appressed, naked toward the base, the

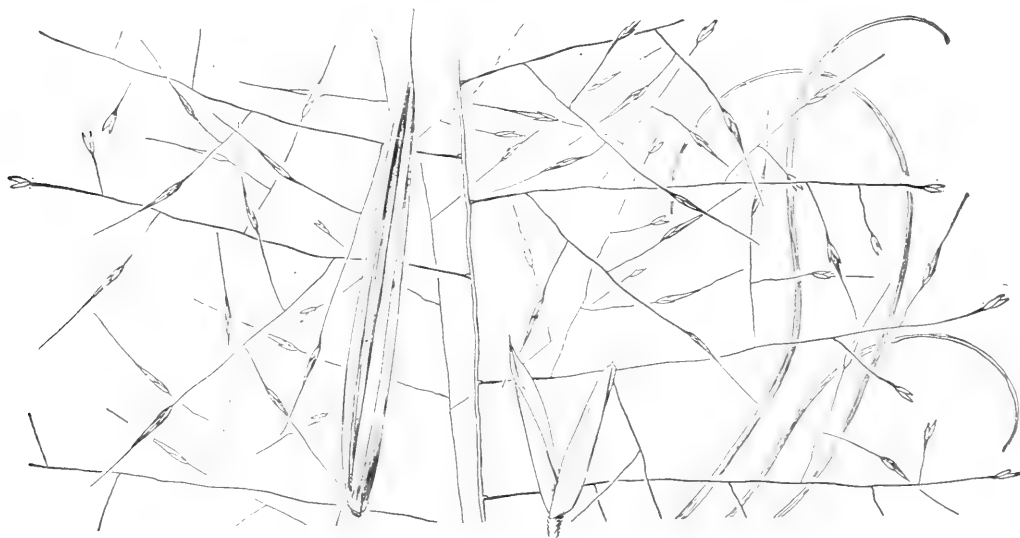


FIGURE 580.—*Muhlenbergia reverchonii*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Reverchon, Tex.)

campes ligulata Scribn., not *Muhlenbergia ligulata* Scribn. and Merr.)—Canyons and rocky slopes, western New Mexico, Arizona, southern Nevada, and northern Mexico.

65. *Muhlenbergia lindheimeri* Hitchc. (Fig. 584.) Culms erect, 1 to

lower as much as 20 cm. long; spikelets 3 to 4.5 mm. long; glumes acute or somewhat erose, scabrous, 2 to 2.5 mm. long; lemma densely pubescent on the margin toward the very base, the minutely toothed apex awned from just below the teeth, the awn

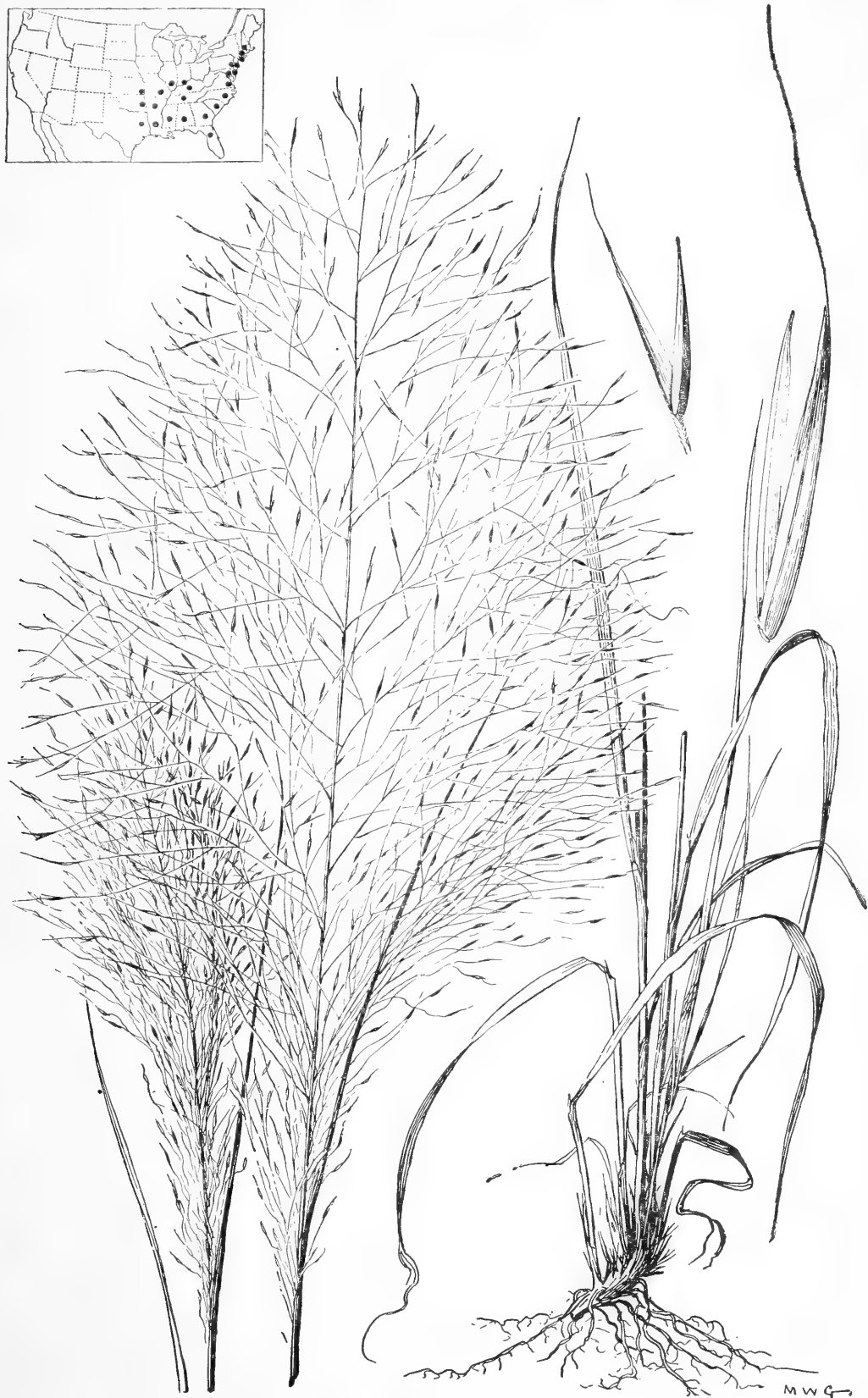


FIGURE 581.—*Muhlenbergia capillaris*. Plant, $\times \frac{1}{2}$; glumes and floret, $\times 10$. (Scribner, Tenn.)



FIGURE 582.—*Muhlenbergia rigida*. Panicle and ligule, $\times 1$; glumes and floret, $\times 10$. (Metcalfe 1447, N. Mex.)

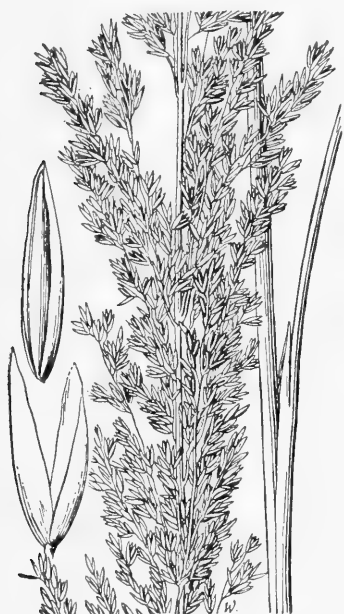


FIGURE 583.—*Muhlenbergia longiligula*. Panicle and ligule, $\times 1$; glumes and floret, $\times 10$. (Jones, Ariz.)

slender, 1.5 to 2 mm. long. 21 — Canyons and ravines, southern Texas.

67. *Muhlenbergia emersléyi* Vasey. BULLGRASS. (Fig. 586.) Culms in large clumps, erect, 50 to 100 cm. tall; sheaths glabrous, slightly scabrous, compressed-keeled, especially those of the innovations; ligule softly membranaceous, 1 to 2 cm. long; blades flat or folded, scabrous, 1 to 4 mm. wide, the lower as much as 50 cm. long; panicle narrow but rather loose, erect or nodding, mostly 20 to 40 cm. long, the branches ascending, more or less fascicled or whorled, naked below; spikelets 2.5 to 4 mm. long, often purplish; glumes thin, equal, acutish, scabrous; lemma about

as long as the glumes, narrowed and scabrous above, villous below, with a delicate flexuous awn, about 1.5 cm. long, or sometimes awnless. 21 — Rocky woods and ravines, Texas to Arizona and Mexico. A good soil binder on steep slopes.

68. *Muhlenbergia rigens* (Benth.) Hitchc. DEERGRASS. (Fig. 587.) Culms rather slender, stiffly erect, in small bunches, with a hard tough base, 1 to 1.5 m. tall; sheaths smooth



FIGURE 584.—*Muhlenbergia lindheimeri*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Type.)



FIGURE 585.—*Muhlenbergia involuta*. Panicle and ligule, $\times 1$; spikelet and floret, $\times 10$. (Type.)

or slightly scabrous, mostly overlapping, the lower crowded, expanded, somewhat papery; ligule firm, truncate, 2 to 3 mm. long; blades scabrous, elongate, involute, tapering into a long slender point; panicle grayish or

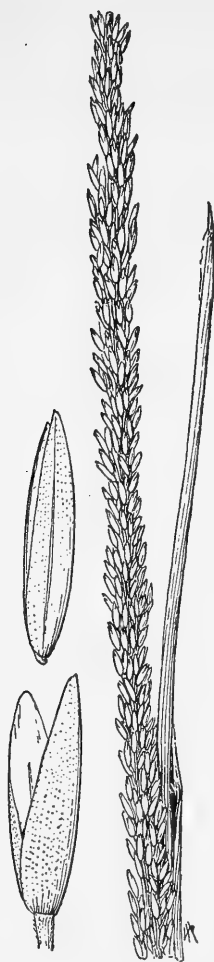


FIGURE 587.—*Muhlenbergia rigens*. Spikelet and floret, $\times 10$. (Type collection.)

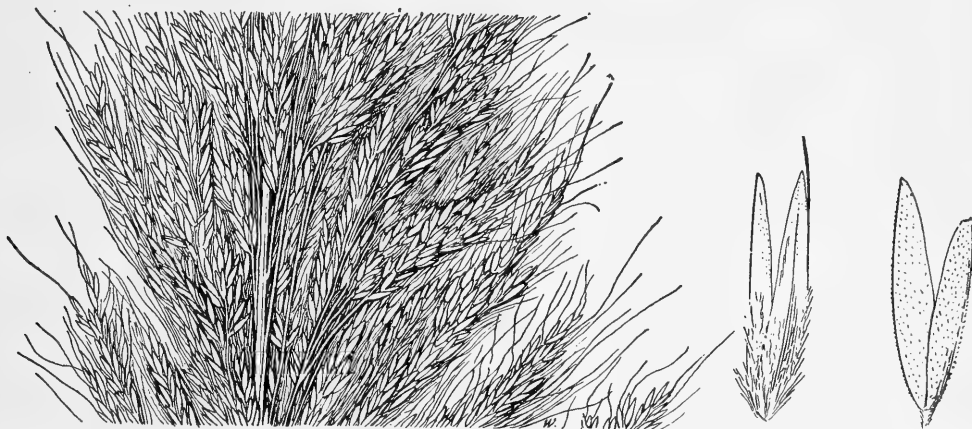


FIGURE 586.—*Muhlenbergia emersleyi*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Wootton and Standley, N. Mex.)

pale, slender, mostly spikelike, 20 to 60 cm. long or more, the lower branches sometimes 5 to 10 cm. long; spikelets 2.5 to 3.5 mm. long, the glumes shorter than the lemma, from acute to obtuse or somewhat erose,

scabrous-puberulent, rarely faintly 3-nerved; lemma scaberulous, sparsely pilose at base, 3-nerved toward the narrowed summit, awnless. 2 (*Epicampes rigens* Benth.)—Dry or open ground, hillsides, gullies, and



FIGURE 588.—*Muhlenbergia mundula*. Plant, $\times 1$; glumes and floret, $\times 10$. (Metcalf 10, N. Mex.)

open forest, southern California. Used by Indians in basket making.

69. *Muhlenbergia munda* I. M. Johnston. (Fig. 588.) Similar to the preceding; ligule 1 to 2 mm. long; panicle similar, but lower branches not more than 4 cm. long; spikelets 3 to 4 mm. long, the glumes shorter than the lemma or sometimes about equaling it. 2 (This and the next species included in *M. rigens* in Manual, ed. 1.)—Rocky canyons and gullies, Nevada, New Mexico, Arizona, and northern Mexico. This and the following doubtfully distinct from *M. rigens*. Many intermediates are found.

70. *Muhlenbergia marshii* I. M. Johnston. (Fig. 589.) Often smaller than *M. rigens*, differing in the minute ligule and narrower, usually awn-tipped glumes and lemma. 2 —



FIGURE 589.—*Muhlenbergia marshii*. Glumes and lemma, $\times 10$. (Type collection.)

Rocky stream banks and canyons, Texas and northern Mexico.

83. SPOROBOLUS R. Br. DROPSEED

Spikelets 1-flowered, the rachilla disarticulating above the glumes; glumes 1-nerved, usually unequal, the second often as long as the spikelet; lemma membranaceous, 1-nerved, awnless; palea usually prominent and as long as the lemma or longer; caryopsis free from the lemma and palea, falling readily from the spikelet at maturity, the pericarp free from the seed, usually thin and closely enveloping it, but readily slipping away when moist. Annuals or perennials, with small spikelets in open or contracted panicles. Type species, *Sporobolus indicus*. Name from Greek *spora*, seed, and *ballein*, to throw, alluding to the free seeds. In some species of this genus the palea splits at maturity, giving the impression of an extra lemma. The first glume is early deciduous in some species. The size of the spikelets is often variable in the same panicle.

Most of the perennial species are palatable forage grasses, but few of them are abundant enough to be of importance. Two species of the Southwest, *S. airoides* and *S. wrightii*, are valuable grasses in the arid and semiarid regions; *S. interruptus* is common on the Arizona Plateau; and the widely distributed *S. cryptandrus* is also important. The seed of *S. flexuosus* and *S. cryptandrus* have been used for food by the Indians.

1a. Plants annual.

Panicles pyramidal, many-flowered, the lower branches verticillate.

Spikelets appressed, short-pedicel, 1.5 to 1.7 mm. long; panicle branches densely flowered..... 1. *S. PULVINATUS*.

Spikelets spreading, long-pedicel, 1.8 to 2 mm. long; panicle branches loosely flowered..... 2. *S. PATENS*.

Panicles narrow, spikelike, few-flowered, usually included in the sheaths.

Lemma pubescent..... 3. *S. VAGINIFLORUS*.

Lemma glabrous..... 4. *S. NEGLECTUS*.

1b. Plants perennial.

2a. Plants producing creeping rhizomes. Panicle narrow or spikelike.

Rhizomes extensively creeping; leaves numerous, crowded, the blades involute, conspicuously distichous; panicle spikelike..... 10. *S. VIRGINICUS*.

Rhizomes short; leaves not numerous nor crowded nor involute; panicle narrow but loose..... 6. *S. MACER*.

2b. Plants without creeping rhizomes.

3a. Glumes nearly equal, much shorter than the lemma. Panicle narrow or spikelike. Panicle branches short and appressed, the panicle spikelike..... 8. *S. POIRETH*.

Panicle branches slender, ascending, the panicle scarcely spikelike.... 9. *S. INDICUS*.

3b. Glumes unequal or if equal as long as the spikelet.

4a. Spikelets mostly 3 to 7 mm. long. Plants usually less than 1 m. tall.

Second glume shorter than the lemma; panicle contracted, more or less included in the sheath.

Lemma glabrous, the palea not exceeding it..... 5. *S. ASPER*.

Lemma pubescent, the palea acuminate, exceeding it..... 7. *S. CLANDESTINUS*.

Second glume about as long as the lemma; panicle open (contracted in *S. purpurascens*), not included.

Branches of the narrow panicle in distinct whorls, usually less than 4 cm. long.

Branches 2 to 3 cm. long, somewhat distant, more or less spreading, the panicle open..... 17. *S. JUNCEUS*.

Branches 1 to 2 cm. long, ascending or appressed, overlapping, the panicle contracted..... 18. *S. PURPURASCENS*.

Branches of the open panicle not in distinct whorls, usually more than 4 cm. long.

Spikelets short-pedicel and appressed along the main panicle branches.

Spikelets about 4 mm. long, purplish..... 14. *S. CURTISSII*.

Spikelets about 3 mm. long, pale..... 30. *S. THARPII*.

Spikelets not appressed, the branches and pedicels somewhat spreading.

Blades terete..... 15. *S. TERETIFOLIUS*.

Blades flat or folded.

Glumes about equal, as long as the lemma..... 16. *S. FLORIDANUS*.

Glumes unequal.

Panicles 30 to 50 cm. long, purple; culms mostly more than 1 m. tall.

13. *S. SILVEANUS*.

Panicles 10 to 20 cm. long, gray or lead-colored; culms 30 to 70 cm. tall.

Blades elongate..... 12. *S. HETEROLEPIS*.

Blades mostly less than half as long as culm.... 11. *S. INTERRUPTUS*.

4b. Spikelets 1 to 2.5 mm. long (sometimes 3 mm. in *S. giganteus*).

5a. Lower panicle branches in distinct whorls, the mature panicle pyramidal; spikelets about 1 mm. long..... 19. *S. PYRAMIDATUS*.

5b. Lower panicle branches not in distinct whorls (occasionally whorled in *S. domingensis*); spikelets 1.5 to 2.5 mm. long.

6a. Basal sheaths compressed-keeled. Panicle branches few, widely spreading, naked for about one-third their length; spikelets 1.5 mm. long.

26. *S. BUCKLEYI*.

6b. Basal sheaths not compressed-keeled.

7a. Sheaths with a conspicuous tuft of white hairs at summit.

Culms robust, 1 to 2 m. tall; spikelets 2.5 to 3 mm. long.

25. *S. GIGANTEUS*.

Culms more slender, mostly less than 1 m. tall; spikelets 2 to 2.5 mm. long.

Panicle open, often large, the branches and branchlets flexuous, the spikelets loosely arranged..... 22. *S. FLEXUOSUS*.

Panicle open or compact, if open the spikelets crowded on the branchlets.

Panicle, or the exerted portion, somewhat open, the branches naked below (sometimes entirely enclosed).

Base of plant a close tuft..... 21. *S. CRYPTANDRUS*.

Base of plant a cluster of knotty rhizomes. Culms erect, slender, mostly less than 30 cm. tall; blades short, involute, spreading.

23. *S. NEALLEYI*.

Panicle compact, spikelike, usually exerted..... 24. *S. CONTRACTUS*.

7b. Sheaths naked or nearly so at the summit.

Pedicels elongate, capillary..... 29. *S. TEXANUS*.

Pedicels short.

Panicle 1 to 2 times as long as wide, loose, the branches not crowded; blades mostly involute..... 27. *S. AIROIDES*.

Panicle more than 3 times as long as wide, relatively dense; blades mostly flat.

Panicle not more than 20 cm. long, usually smaller.

20. *S. DOMINGENSIS*.

Panicle commonly 50 cm. long, rarely as small as 25 or 30 cm.

28. *S. WRIGHTII*.



FIGURE 590.—*Sporobolus pulvinatus*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Type.)

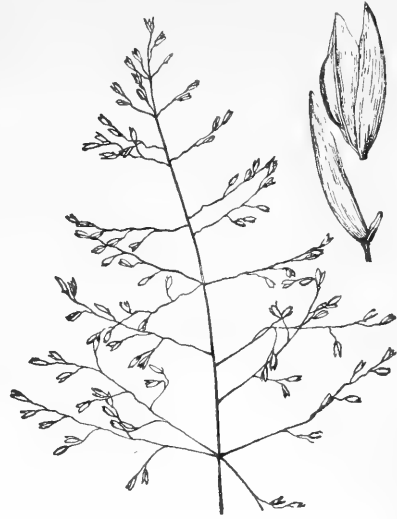


FIGURE 591.—*Sporobolus patens*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Type.)

1. *Sporobolus pulvinatus* Swallen. (Fig. 590.) Culms 5 to 30 cm. tall in small erect or spreading tufts; blades mostly 4 to 7 cm. long, 2 to 5 mm. wide, lanceolate-acuminate, scabrous, the uppermost much reduced; panicles 2 to 5 or rarely to 8 cm. long, pyramidal, the branches erect to spreading, densely flowered, usually naked at the base; spikelets 1.5 to 1.7 mm. long, appressed; first glume minute, the second as long as the spikelet, abruptly acute or subobtuse; lemma acute or subobtuse; palea broad, conspicuous, as long as the lemma. ☉ —Sandy land, Texas, New Mexico, and Arizona; northern Mexico.

2. *Sporobolus patens* Swallen. (Fig. 591.) Culms 10 to 25 cm. tall, slender, erect; sheaths glabrous, sparsely hispid at the throat, the uppermost elongate, almost bladeless; blades 1 to 3.5 cm. long, 1 to 2 mm. wide, flat, scabrous on the margins; panicles pyramidal, 2.5 to 5 cm. long, the slender branches spreading or even reflexed, few-flowered, the branchlets abruptly spreading; spikelets 1.8 to 2 mm. long, the pedicels slender, spreading, as much as 3 mm. long; first glume minute; second glume and lemma equal, acute; palea shorter than the lemma, truncate, minutely

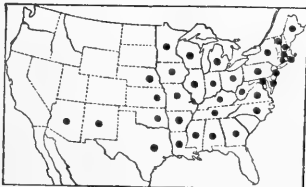
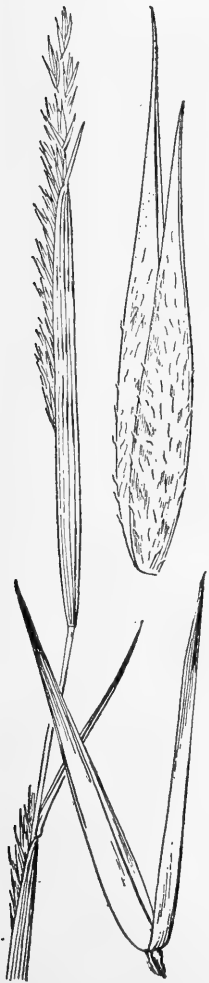


FIGURE 592.—*Sporobolus vaginiflorus*. Plant, $\times 1$; glumes and floret, $\times 10$. (Deam 39615, Ind.)

dentate. ☉ —Open dry ground, southern Arizona.

3. *Sporobolus vaginiflorus* (Torr.)

Wood. (Fig. 592.) Annual, branching from base; culms erect to spreading, mostly 20 to 40 cm. tall, sometimes as much as 75 cm.; blades slender, subinvolute, the lower elongate; panicles terminal and axillary, slender, mostly not more than 3 cm. long, the terminal exserted or partly included, the axillary included in the sheaths or slightly exserted, late in the season the sheaths swollen and containing cleistogamous spikelets; glumes acute, about equal, 3 to 5 mm. long; lemma as long as the glumes or exceeding them, acute or acuminate, rather sparsely pubescent, sometimes mottled with dark spots; palea acuminate, sometimes longer than the lemma.

☉ —Sandy soil or open waste ground, Maine and Ontario to Minnesota and Nebraska, south to Georgia, Texas, and Arizona.



FIGURE 593.—*Sporobolus neglectus*. Plant, $\times 1$; spikelet and floret, $\times 10$. (Deam 33426, Ind.)

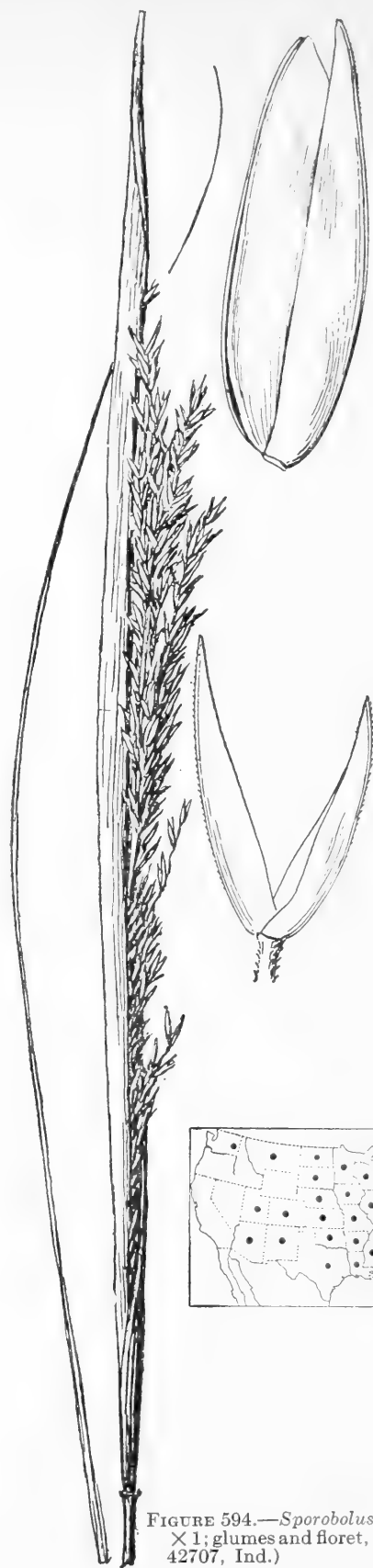


FIGURE 594.—*Sporobolus asper*. Plant $\times 1$; glumes and floret, $\times 10$. (Deam 42707, Ind.)



4. *Sporobolus negléctus* Nash. (Fig. 593.) Differing from *S. vaginiflorus* chiefly in the smaller, paler, plumper spikelets, 2 to 3 mm. long, and in the glabrous lemma; lower blades often sparsely pilose; panicles usually entirely hidden in the more swollen sheaths. ☉ —Dry open ground and sandy fields, Quebec and Maine to Montana, south to Virginia, Tennessee, and Texas; also Washington and Arizona. A form from Missouri (Ozark Mountains), with rather strongly pilose leaves, has been differentiated as *S. ozarkanus* Fernald.

5. *Sporobolus áspér* (Michx.) Kunth. (Fig. 594.) Perennial; culms erect, often rather stout, solitary or in small tufts, 60 to 120 cm. tall; blades elongate, flat, becoming involute, 1 to 4 mm. wide at base, tapering to a fine point; panicle terminal and axillary, pale or whitish, sometimes purplish, contracted, more or less spikelike, usually enclosed at base or sometimes entirely in the inflated upper sheath, 5 to 15 cm. long; spikelets 4 to 6 mm. long; glumes rather broad, keeled, subacute, the first about half as long as the spikelet, the second two-thirds to three-fourths as long; lemma and palea subequal, glabrous, the tip boat-shaped. 2 —Prairies and sandy meadows, Vermont to Montana, south to Louisiana and Arizona; eastern Washington.

SPOROBOLUS ASPER var. PILÓsus (Vasey) Hitchc. Sheaths and blades more or less pilose. 2 (*S. pilosus* Vasey.)—Prairies and rocky hills, Kansas (Saline County and westward), Texas (Del Rio), and Montana.

SPOROBOLUS ASPER var. HOOKÉRI (Trin.) Vasey. Less robust, the more slender, fewer flowered, panicle looser; spikelets usually smaller, 3 to 5 mm. long. 2 (*S. attenuatus* Nash; *S. drummondii* Vasey.)—Plains, Missouri, Kansas, Mississippi, Texas, and Oklahoma. Foliage rarely somewhat villous.

6. *Sporobolus mácer* (Trin.) Hitchc. (Fig. 595.) Perennial, with



FIGURE 595.—*Sporobolus macer*. Plant, $\times \frac{1}{2}$; glumes and floret, $\times 10$. (Chase 4341, Miss.)

short scaly rhizomes; culms erect, 50 to 70 cm. tall; blades flat, 10 to 20 cm. long, 1 to 2 mm. wide, sometimes wider, pilose on the upper surface near base and at the throat of the sheath; panicle narrow, often enclosed at base, 5 to 15 cm. long, the branches erect; spikelets 4 to 5 mm.



FIGURE 596.—*Sporobolus clandestinus*. Plant, $\times 1$; glumes and floret, $\times 10$. (Chase 4265, Fla.)

long, the glumes keeled, the first about two-thirds as long, the second a little longer than the first; lemma and palea subequal, the tips boat-shaped. ♀ —Wet pineland, Oklahoma, Mississippi, Louisiana, and Texas. Except for the rhizomes this species resembles *S. asper* var. *hookeri*.

7. *Sporobolus clandestinus* (Bieler.) Hitchc. (Fig. 596.) Perennial; culms relatively stout to slender, erect to spreading, 50 to 100 cm. tall; lower sheaths sometimes pilose; blades flat, becoming involute, with a long fine point; panicle narrow, con-

tracted, 5 to 10 cm. long, usually partly enclosed; spikelets 5 to 7 mm. long, the glumes keeled, acute or subacute, the first more than half as long as the spikelet, the second longer than the first; lemma sparsely appressed-pubescent, acuminate, the palea longer, sometimes as much as 10 mm. long. ♀ (*S. canovirens* Nash.)—Sandy fields, pine barrens, hills, and prairies, Connecticut to Wisconsin and Kansas, south to Florida and Texas.

8. *Sporobolus poiretii* (Roem. and Schult.) Hitchc. SMUTGRASS. (Fig. 597.) Perennial; culms erect, solitary or in small tufts, 30 to 100 cm. tall; blades flat to subinvolute, rather firm, 2 to 5 mm. wide at base, elongate, tapering to a fine point; panicle usually spikelike but more or less interrupted, 10 to 40 cm. long, the branches appressed or ascending; spikelets about 2 mm. long; glumes obtuse, somewhat unequal, about half as long as the spikelet or less; lemma acutish. ♀ (*Sporobolus berterianus* (Trin.) Hitchc. and Chase.)—Open ground and waste places, Virginia to Tennessee and Oklahoma, south to Florida, Texas, and the warmer parts of America to Argentina; on ballast in Oregon and New Jersey; tropical Asia, apparently introduced in America. At maturity the extruded reddish caryopses remain for some time sticking to the panicle by the mucilaginous pericarp. Often affected with a black fungus. This species has been referred to the Australian *S. elongatus* R. Br., which seems to be distinct, differing in its looser panicle.

9. *Sporobolus indicus* (L.) R. Br. (Fig. 598.) Resembling *S. poiretii*, but the blades more slender, especially at base, and the panicle branches longer, more slender, less densely flowered, loosely ascending to somewhat spreading, the panicle not spikelike. ♀—Punta Gorda, Fla.; ballast, Mobile, Ala.; tropical America.

10. *Sporobolus virginicus* (L.) Kunth. (Fig. 599.) Perennial, with



FIGURE 597.—*Sporobolus poiretii*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 10$. (Chase 7043, Fla.)

numerous branching widely creeping slender rhizomes (yellowish in drying); culms erect, 10 to 40 cm. tall; sheaths overlapping, more or less

pilose at the throat; blades flat or becoming involute especially toward the fine point, conspicuously distichous, mostly less than 5 cm. long or

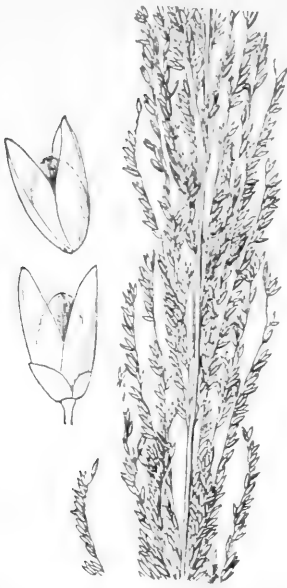


FIGURE 598.—*Sporobolus indicus*. Panicle, $\times 1$; spikelet and floret, $\times 10$. (Léon 867, Cuba.)

on the innovations longer; panicle pale, contracted or spikelike, 2 to 8



FIGURE 599.—*Sporobolus virginicus*. Plant, $\times 1$; glumes and floret, $\times 10$. (Nash 2467, Fla.)

cm. long, 5 to 10 mm. thick; spikelets 2 to 2.5 mm. long; glumes and lemma about equal. 2 —Sandy or muddy seashores and saline marshes, forming extensive colonies, with relatively few flowering culms, southeastern Virginia (Gronovius, Fl. Virg.) to Florida and Texas, south through the West Indies to Brazil. Readily grazed where available. A robust form (called *S. littoralis* (Lam.) Kunth), with culms as much as 1 m. tall and panicles as much as 15 cm. long, is found in the West Indies and extends into Florida. Complete intergradations are found, and the type specimen is not the robust form.

11. *Sporobolus interrúptus* Vasey.

BLACK DROPSEED. (Fig. 600.) Perennial, densely tufted; culms erect, 30 to 60 cm. tall, the leaves crowded at base, about 2 on the culm; sheaths more or less pilose; blades flat or folded, sparsely pilose to glabrous, 1 to 2 mm. wide; panicle 10 to 20 cm. long, brownish-leadens, the branches distant, finally spreading, naked at base; spikelets about 6 mm. long, short-pedicelcd; glumes acute, the first 2 to 3 mm., the second 4 to 6 mm. long; lemma and palea acute, about equal. 2 —Grassy plains and hills, Arizona. The second glume and lemma may have wrinkles toward the summit that look like nerves.

12. *Sporobolus heterólepis* (A.

Gray) A. Gray. PRAIRIE DROPSEED. (Fig. 601.) Perennial, in dense tufts; culms erect, slender, 30 to 70 cm. tall; sheaths somewhat pilose at the throat, the lower sometimes sparsely pilose on the back; blades elongate, flat, becoming involute at the slender attenuate tip, 2 mm. or less wide; panicle, 5 to 20 cm. long, the branches ascending or spreading, 3 to 6 cm. long, naked below, few-flowered above; spikelets grayish; glumes acuminate, the first 2 to 4 mm. long, the second 4 to 6 mm. long; lemma shorter than the second glume, palea slightly longer than the lemma; caryopsis globose, nutlike, nearly 2 mm. thick, finally splitting the palea. 2 —

Prairies, Quebec to Saskatchewan, south to Connecticut, eastern Texas, and Colorado.

13. *Sporobolus silveanus* Swallen. (Fig. 602.) Culms 85 to 115 cm. tall, densely tufted, erect, scabrous; sheaths glabrous or scaberulous, pubescent on the collar, the uppermost elongate, the lower shiny, becoming more or less papery with age; blades as much as 45 cm. long, 1 to 2 mm. wide, usually involute, curved or flexuous; panicles 30 to 50 cm. long, the ascending branches rather distant, few-flowered, naked at the base; spikelets 5 to 6 mm. long, purple; first glume 3 to 4.5 mm. long, the second 4.5 to 6 mm. long; lemma subacute; palea as long as the lemma, the keels obscure. ♀ —Open woods, western Louisiana and eastern Texas.

14. *Sporobolus curtissii* (Vasey) Small ex Scribn. (Fig. 603.) Perennial, in dense tufts; culms slender, 30 to 70 cm. tall; basal sheaths pilose at the throat; blades flat or folded, flexuous, about 1 mm. wide, pilose on the upper surface near the base; panicle pyramidal, open, 7 to 20 cm. long, the branches solitary or in twos, ascending; spikelets appressed along the main branches, bronze or purplish, about 4.5 mm. long; glumes about equal, acuminate, as long as or longer than the lemma and palea. ♀ —Dry pine barrens, North Carolina to Florida.

15. *Sporobolus teretifolius* Harper. (Fig. 604.) Perennial, in tufts; culms erect, wiry, 60 to 80 cm. tall, sheaths pilose at the throat; blades elongate, slender, terete, wiry, flexuous, pilose on the upper surface at base; panicle pyramidal, open, 15 to 20 cm. long, the capillary branches, branchlets, and pedicels ascending to spreading; spikelets purplish brown, 4 to 5 mm. long; glumes acute, the first half as long, the second as long as the equal lemma and palea. ♀ —Moist pine barrens, North Carolina and Georgia.

16. *Sporobolus floridanus* Chapm. (Fig. 605.) Plants more robust than *S. curtissii*, as much as 1 m. tall;



FIGURE 600.—*Sporobolus interruptus*. Plant, $\times 1$; glumes and floret, $\times 10$. (Rusby, Ariz.)

sheaths keeled, the basal ones somewhat pilose at throat, the base indurate and shining, blades folded at base, usually flat above, 2 to 5 mm. wide, abruptly narrowed at apex; panicle narrow, open, 15 to 35 cm. long, the branches and branchlets ascending; spikelets 4 to 5 mm. long;



FIGURE 601.—*Sporobolus heterolepis*. Plant, $\times 1$; spikelet and floret with caryopsis and split palea, $\times 10$. (McDonald, Ill.)

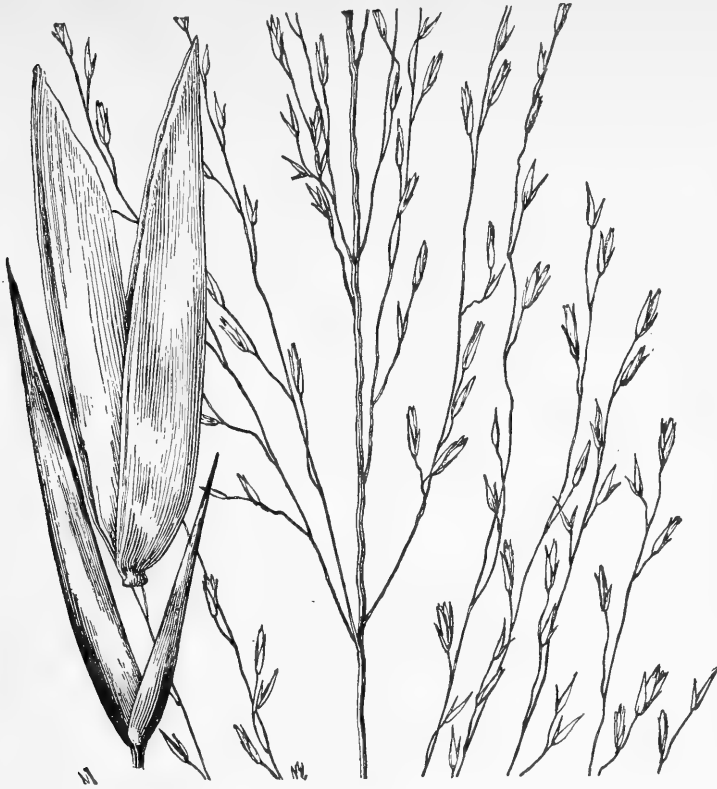


FIGURE 602.—*Sporobolus silveanus*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Type.)



FIGURE 603.—*Sporobolus curtissii*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Bitting 1050, Fla.)

glumes acute, subequal, about as long as the lemma and palea. 21 —Low pine barrens, North Carolina to Florida.

17. *Sporobolus junceus* (Michx.) Kunth. (Fig. 606.) Perennial, in dense bunches; culms erect, slender, about 3-noded, 30 to 60 cm. tall; blades folded or involute, slender, glabrous; panicle mostly bronze brown, oblong or narrowly pyramidal, open, 7 to 15 cm. long, 2 to 5 cm. wide, the flexuous branches (2 to 3 cm. long) in rather regular whorls 1 to 3 cm. apart, widely spreading to ascending, naked at base, the short-pedicelled spikelets appressed along the upper part; spikelets about 3 mm. long; first glume about half as long, the second glume as long as the acute lemma or a little longer. 21 (*S. gracilis* (Trin.) Merr.)—Pine barrens of the Coastal Plain, southeastern Virginia to Florida and Texas. Common in the high pineland of Florida.

18. *Sporobolus purpurascens* (Swartz) Hamilt. (Fig. 607.) Re-



FIGURE 604.—*Sporobolus teretifolius*. Plant, $\times 1$; glumes and floret, $\times 10$. (Harper 677, Ga.)

sembling *S. junceus*; blades flat or folded, 1 to 3 mm. wide; panicle 10 to 15 cm. long, more contracted than in *S. junceus*, the shorter branches numerous in the whorls, ascending or appressed, floriferous nearly to the base; spikelets about as in *S. junceus*, greenish purple. 2 —Sandy

prairies, southern Texas and eastern Mexico; West Indies to Brazil.

19. *Sporobolus pyramidatus* (Lam.) Hitchc. (Fig. 608.) Perennial, in spreading or prostrate tufts; culms 10 to 40 cm. tall; leaves crowded at the base, the sheaths pilose at the throat; blades flat, mostly less than 10 cm. long, 2 to 4 mm. wide, sparsely long-ciliate toward the base; panicle pale, pyramidal, 3 to 7 cm. long, rarely longer, the branches spreading, somewhat viscid, 1 to 3 cm. long, naked below, closely flowered above, the lowermost in a distinct whorl; spikelets a little more than 1 mm.



FIGURE 605.—*Sporobolus floridanus*. $\times 10$. (Curtiss 4054, Fla.)



FIGURE 606.—*Sporobolus junceus*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Curtiss 4056, Fla.)

long; first glume minute, the second as long as the lemma and palea. 2 (S. *argutus* Kunth.) —Sandy or gravelly soil, especially along streets and along the seashore and in the interior in alkaline soil, Kansas and Colorado to Louisiana and Texas; southern Florida; tropical America.

20. *Sporobolus domingensis* (Trin.) Kunth. (Fig. 609.) Perennial; culms erect, 20 to 100 cm. tall; leafy at base; blades rather firm, mostly 5 to 20 cm. long, 3 to 8 mm. wide, drying subinvolute, panicle pale, mostly 10 to 15 cm. long, the branches ascending or appressed; spikelets



FIGURE 608.—*Sporobolus pyramidatus*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Hitcheock 5343, Tex.)

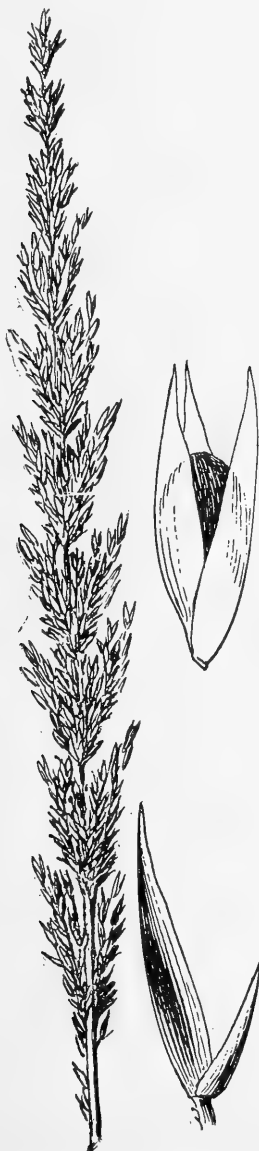


FIGURE 607.—*Sporobolus purpurascens*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Hitcheock, Tex.)

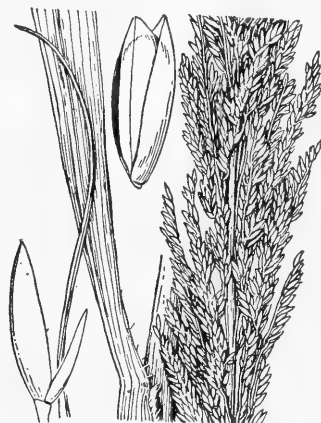


FIGURE 609.—*Sporobolus domingensis*. Plant, $\times 1$; glumes and floret, $\times 10$. (Hitcheock 530, Fla.)

about 2 mm. long, the first glume half as long. 2 —Coral sand and rocks along the coast of southern Florida, mostly on the Keys, north to Sanibel Island; West Indies.

21. *Sporobolus cryptandrus* (Torr.) A. Gray. SAND DROPSEED. (Fig. 610.) Perennial, usually in rather small tufts; culms erect or spreading, sometimes prostrate, 30 to 100 cm. tall; sheaths with a conspicuous tuft of long white hairs at summit; blades flat, 2 to 5 mm. wide, more or less involute in drying, tapering to a fine point; panicles terminal and axillary, usually included at base, sometimes entirely included, the well-



FIGURE 610.—*Sporobolus cryptandrus*. Plant, $\times \frac{1}{2}$; glumes and floret, $\times 10$. (Shear 253, Nebr.)

developed terminal panicles open, as much as 25 cm. long, the branches spreading or sometimes reflexed,

rather distant, naked at base, as much as 8 cm. long or even more, the spikelets crowded along the upper

part of the main branches; spikelets from pale to leaden, 2 to 2.5 mm. long; first glume one-third to half as long, the second about as long as the acute lemma and palea. ♀ —Sandy open ground, Maine and Ontario to Alberta and Washington, south to North Carolina, Indiana, Louisiana, southern California, and northern Mexico.

22. *Sporobolus flexuosus* (Thurb.) Rydb. MESA DROPSEED. (Fig. 611.) Resembling *S. cryptandrus*, differing in the more open often elongate panicles, the slender branches and branchlets spreading or drooping, flexuous, loosely flowered. ♀ —Mesas, western Texas to southern Utah, Nevada, southern California, and northern Mexico.

23. *Sporobolus nealleyi* Vasey. NEALLEY DROPSEED. (Fig. 612.) Resembling dwarf forms of *S. cryptandrus*, but differing in the loose rhizomatous base; culms slender, erect, 15 to 40 cm. tall; blades slender, involute, squarrose-spreading, mostly less than 5 cm. long; panicle delicate, open, 3 to 8 cm. long, sometimes enclosed in the sheaths, the branches



FIGURE 612.—*Sporobolus nealleyi*. Panicle, $\times \frac{1}{2}$; glumes and floret, $\times 10$. (Nealley, Tex.)

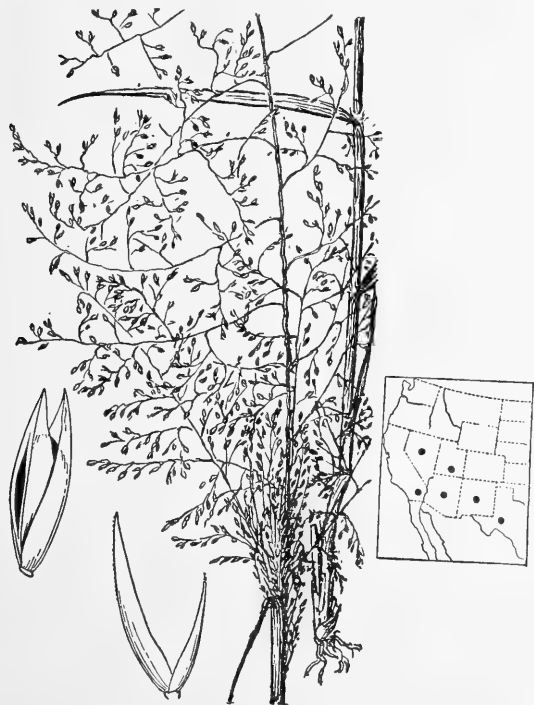
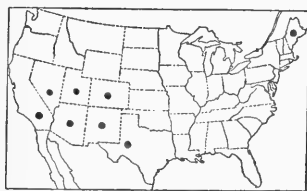


FIGURE 611.—*Sporobolus flexuosus*. Plant, $\times \frac{1}{2}$; glumes and floret, $\times 10$. (Vasey, N. Mex.)



FIGURE 613.—*Sporobolus contractus*. Panicle, $\times \frac{1}{2}$; glumes and floret, $\times 10$. (Pringle, Ariz.)

and branchlets spreading, the spikelets less crowded than in *S. cryptandrus*. ♀ —Gypsum sands, western Texas, Nevada, New Mexico and Arizona.

24. *Sporobolus contractus* Hitchc. SPIKE DROPSEED. (Fig. 613.) Differing from *S. cryptandrus* in the spikelike panicle as much as 50 cm. long, usually



FIGURE 614.—*Sporobolus giganteus*. Panicle, $\times \frac{1}{2}$; glumes and floret, $\times 10$. (Nealley, Tex.)

included at the base, rarely entirely included in the sheath. 2 (S. strictus Merr.)—Mesas, dry bluffs, and sandy fields, Arkansas, Colorado to Nevada, south to western Texas, southeastern California, and Sonora; adventive in Maine.

25. *Sporobolus giganteus* Nash. GIANT DROPSEED. (Fig. 614.) Resembling *S. cryptandrus* and *S. contractus*; culms 1 to 2 m. tall, erect, robust; blades as much as 1 cm. wide; panicle usually thicker than in *S. contractus*, less spikelike; spikelets 2.5 to 3 mm. long. 2 —Mesas and sandhills, Oklahoma and western Texas to Colorado and Arizona.

26. *Sporobolus buckleyi* Vasey. (Fig. 615.) Perennial, the base strongly compressed; culms erect, slender, 40 to 80 cm. tall; sheaths keeled, pubescent on the margin and collar; blades flat, 4 to 7 mm. wide; panicle open, 10 to 30 cm. long, the slender branches widely spreading, as much as 10 cm. long, solitary, rather distant, naked below, with closely flowered short-appressed branchlets above; spikelets about 1.5 mm. long; glumes narrow, the first a little shorter, the second a little longer than the acute lemma; palea about as long as the lemma, splitting as the grain (1 mm. long) ripens. 2 —Texas and eastern Mexico.

27. *Sporobolus airoides* (Torr.) Torr. ALKALI SACATON. (Fig. 616.) Perennial, in large tough bunches; culms erect to spreading, 50 to 100 cm. tall; sheaths pilose at the throat; ligule pilose; blades elongate, flat, soon becoming involute, usually less than 4 mm. wide, often flexuous; panicle nearly half the entire height of the plant, at maturity half to two-thirds as wide as long, the stiff slender branches and branchlets finally widely spreading, naked at base, the spikelets aggregate along the upper half to two-thirds; spikelets 2 to 2.5 mm. long, the first glume about half as long, commonly falling toward



FIGURE 615.—*Sporobolus buckleyi*. Panicle, $\times \frac{1}{2}$; glumes and floret, $\times 10$. (Nealley, Tex.)



FIGURE 616.—*Sporobolus airoides*. Plant, $\times \frac{1}{2}$; glumes and floret, $\times 10$. (Metcalf, N. Mex.)

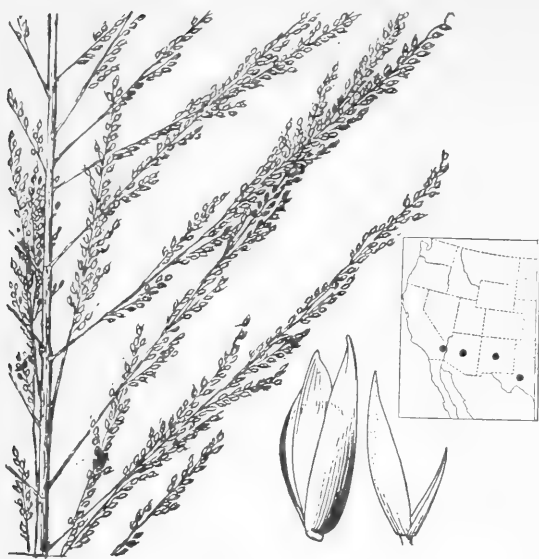


FIGURE 617.—*Sporobolus wrightii*. Panicle, $\times \frac{1}{2}$; glumes and floret, $\times 10$. (Hitchcock 3648, Ariz.)

maturity; second glume, lemma, and palea about equal, the palea splitting as the grain ripens. 21 — Meadows and valleys, especially in moderately alkaline soil, South Dakota and Missouri to eastern Washington, south to Texas and southern California; Mexico. Mature spikelets with the first glume fallen and the palea split to the base are puzzling to the beginner. Less mature complete spikelets will usually be found at the base of the panicle. A good forage grass in alkaline regions; often called bunchgrass.

28. *Sporobolus wrightii* Munro ex Scribn. SACATON. (Fig. 617.) Perennial, in large dense tufts; culms robust, erect, firm and hard, 1 to 2 m. tall; sheaths sparsely pilose at the throat; ligule pilose; blades elongate, flat, involute in drying, 3 to 6 mm. wide; panicle pale, narrow, open, mostly 30 to 60 cm. long, the branches crowded, straight, stiffly ascending, the branchlets appressed, closely flowered from the base or nearly so; spikelets 2 to 2.5 mm. long, the first glume about one-third as long, the second two-thirds to three-fourths as long, acute; lemma and palea about equal. 21 — Mesas and valleys, southern and western Texas and Oklahoma to southern California and central Mexico. Useful for grazing when young;

also furnishes hay and makes good winter range.

29. *Sporobolus texanus* Vasey. (Fig. 618.) Perennial, in close hemispherical tufts; culms erect to spreading, slender, wiry, 30 to 50 cm. tall; sheaths pilose at the throat, the lower often papillose-pilose on the surface; blades flat, involute in drying, mostly less than 10 cm. long, 1 to 4 mm. wide; panicle open, rather diffuse, breaking away at maturity, 15 to 30 cm. long, about as wide, the capillary scabrous branches, branchlets, and long pedicels stiffly spreading; spikelets about 2.5 mm. long, the first glume acute, one-third to half as long, the second, acuminate, slightly exceeding the acute lemma and palea, the palea early splitting. 21 — Mesas, valleys, and salt marshes, Kansas and Colorado to Texas and Arizona.

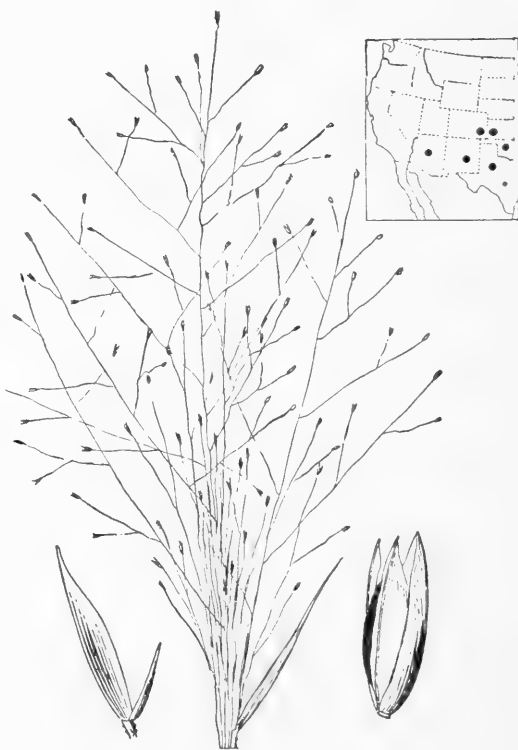


FIGURE 618.—*Sporobolus texanus*. Panicle, $\times \frac{1}{2}$; glumes and floret with caryopsis, $\times 10$. (Nealley, Tex.)

30. *Sporobolus tharpii* Hitchc. (Fig. 619.) Perennial, densely tufted; culms 60 to 100 cm. tall; sheaths glabrous, the lower firm, loose, shining;

blades elongate, involute, flexuous,
about 1 mm. thick, tapering to a long

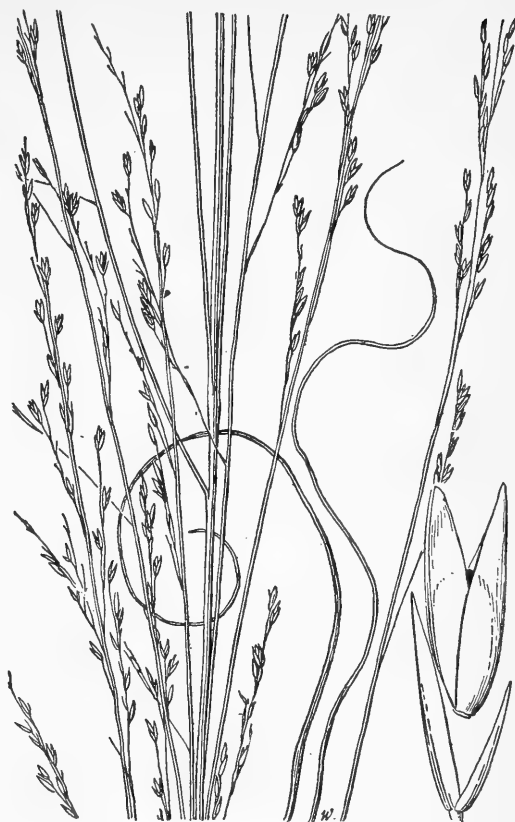
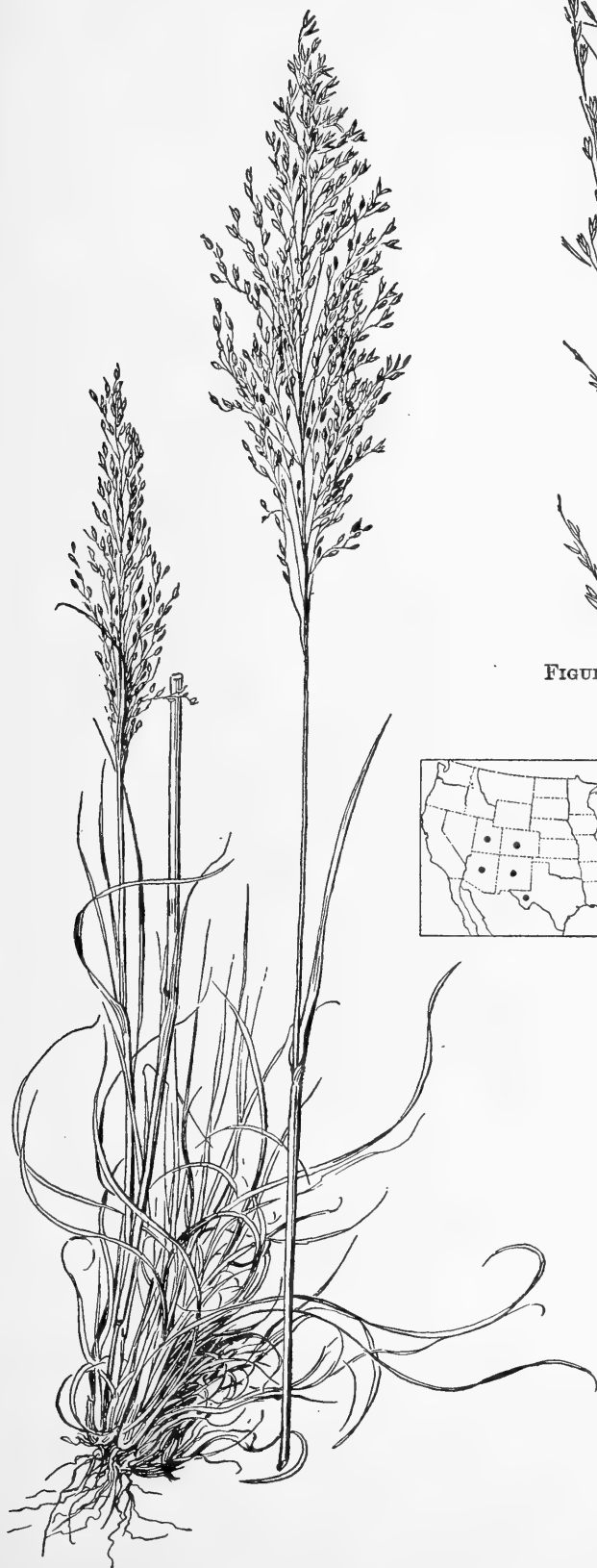


FIGURE 619.—*Sporobolus tharpii*. Panicle, $\times 1$; glumes and floret, $\times 10$. (Type.)



FIGURE 620.—*Blepharoneuron tricholepis*. Plant, $\times \frac{1}{2}$; glumes and floret, $\times 10$. (Shear 1182, Colo.)



fine point, long-ciliate at base; panicle open, as much as 30 cm. long, the branches stiffly ascending, the lower as much as 15 cm. long; spikelets appressed along the nearly simple branches and branchlets, about 3 mm. long; first glume narrow, acuminate, about half as long as the spikelet, the second glume, lemma, and palea acute, about equal. 2 —Known only from Padre Island, Tex.

84. BLEPHARONEÛRON Nash

Spikelets 1-flowered, the rachilla disarticulating above the glumes; glumes subequal, rather broad; lemma 3-nerved, the nerves densely silky villous; palea densely villous between the two nerves. Tufted perennial, with open, narrow panicles. Type species, *Blepharoneuron tricholepis*. Name from Greek *blepharis*, eyelash, and *neuron*, nerve, alluding to the villous nerves of the lemma.

1. *Blepharoneuron tricholepis* (Torr.) Nash. HAIRY DROPSEED (Fig. 620.) Culms erect, densely tufted, slender, 20 to 60 cm. tall; leaves crowded on the innovations, mostly less than half as long as the culm, the slender blades flat, soon becoming in-

volute, often flexuous; panicle grayish, elliptic, 5 to 20 cm. long, 2 to 5 cm. wide, many-flowered, the branches ascending, the pedicels capillary, flexuous; spikelets 2.5 to 3 mm. long; glumes obtuse or subacute, a little shorter than the abruptly pointed lemma; palea slightly exceeding the lemma. 2 —Rocky slopes and dry open woods, 2,000 to 3,500 m., Colorado to Utah, south to Texas, Arizona, and Mexico. Palatable and sufficiently abundant in places to be of importance.

85. CRÝPSIS Ait.

Spikelets 1-flowered, disarticulating below the glumes; glumes about equal, narrow, acute; lemma broad, thin, 1-nerved; palea similar to the lemma, about as long, splitting between the nerves; fruit readily falling from the lemma and palea, the seed free from the thin pericarp (easily removed when wet). Spreading annual, with capitate inflorescences in the axils of a pair of broad spathes, these being enlarged sheaths with short rigid blades. Type species, *Crypsis aculeata* (L.) Ait. Name from Greek *krupsis*, concealment, alluding to the partially hidden inflorescence.

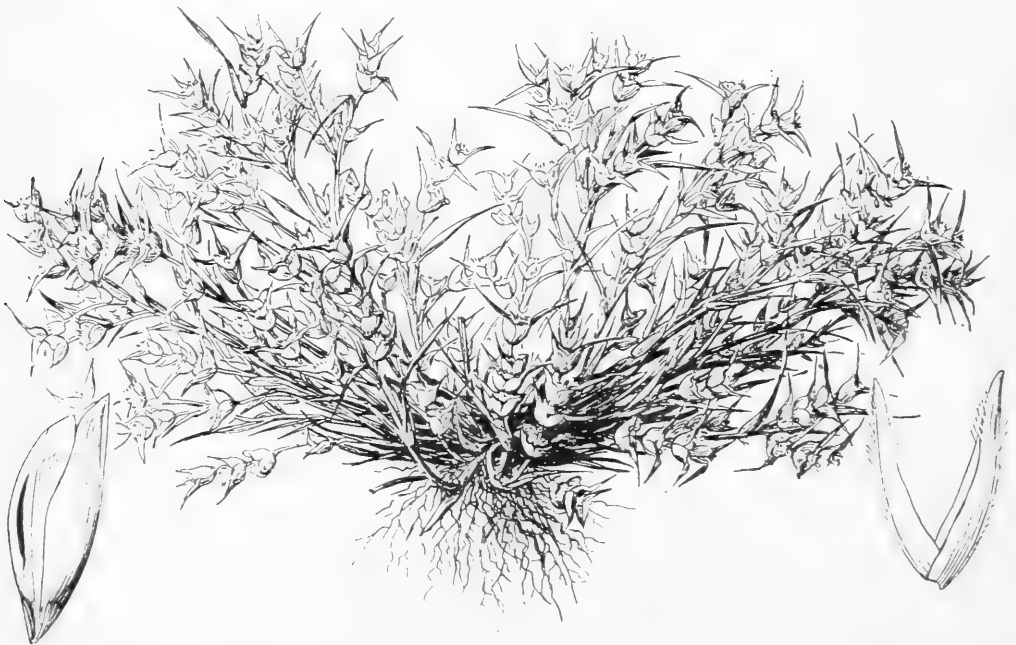


FIGURE 621.—*Crypsis niliaca*. Plant, $\times \frac{1}{2}$; glumes and floret, $\times 10$. (Brandeggee, Calif.)

1. *Crypsis niliaca* Fig. and De Not. (Fig. 621.) Freely branching, prostrate, the mats to 30 cm. in diameter, often depauperate, 2 to 3 cm. wide; sheaths tuberculate, the summit bearded; blades flat, involute toward the apex, 2 to 5 cm. long, spreading, readily falling from the sheaths, mature plants mostly bladeless; glumes about 3 mm. long, minutely pilose; lemma and palea about as long as the glumes, the broad palea readily splitting between the nerves. (Described under *C. aculeata* in Manual, ed. 1.) ☉ —Overflowed land, dried mud flats, sand bars, and wet alkali ground, Sacramento and San Joaquin Valleys and in Humboldt, Santa Clara, and Los Angeles Counties, Calif. Introduced; first found at Norman, Glenn County, and in alkali hollow, Colusa County, in May 1898, the source of the seed not known. The grass is slowly spreading, the latest collection being made in Santa Clara County in 1942. Egypt and southwestern Asia.

86. HELEÓCHLOA Host ex Roemer

Spikelets 1-flowered, the rachilla mostly disarticulating above the glumes; glumes about equal, narrow, acute; lemma broader, thin, 1-nerved, a little longer than the glumes; palea nearly as long as the lemma, readily splitting between the nerves. Low spreading tufted annuals with oblong, dense, spikelike panicles, the subtending leaves with inflated sheaths and reduced blades. Type species, *Heleochloa alopecuroides*. Name from Greek *helos*, marsh, and *chloa* grass, alluding to the habitat of the type species.

1. *Heleochloa schoenoides* (L.) Host. (Fig. 622, A.) Culms tufted, branching, erect to spreading and geniculate, 10 to 30 cm. long; sheaths often somewhat inflated; blades flat, with involute slender tips, mostly less than 10 cm. long, 2 to 4 mm. wide; panicle pale, 1 to 4 cm. long, 8 to 10 mm. thick; spikelets about 3 mm.

long; pericarp readily separating. ☉ —Waste places, Massachusetts to Wisconsin, south to Delaware, Ohio, Illinois, and Iowa; California; introduced from Europe.

Heleochloa alopecuroides (Pill. and Mitterp.) Host. (Fig. 622, B.) Differing from *H. schoenoides* in the more slender panicles, 4 to 5 mm. thick, exerted at maturity; spikelets about 2 mm. long. ☉ —Ballast, Philadelphia, Pa., and near Portland, Oreg.; Europe.

87. BRACHYÉLYTRUM Beauv.

Spikelets 1-flowered, the rachilla disarticulating above the glumes, prolonged behind the palea as a slender naked bristle; glumes minute, the first often obsolete, the second sometimes awned; lemma firm, narrow, 5-nerved, the base extending into a pronounced oblique callus, the apex terminating in a long straight scabrous awn. Erect, slender perennials with short slender knotty rhizomes, flat blades, and narrow, rather few-flowered panicles. Type species, *Brachyelytrum erectum*. Name from Greek *brachus*, short, and *elutron*, cover or husk, alluding to the short glumes.

1. *Brachyelytrum eréctum* (Schreb.) Beauv. (Fig. 623.) Culms 60 to 100 cm. tall; sheaths sparsely retrorse-hispid, rarely glabrous; blades mostly 7 to 15 cm. long, 1 to 1.5 cm. wide, scabrous, sparingly pilose beneath, at least on the nerves and margin; panicle 5 to 15 cm. long, the short branches appressed; second glume 0.5 to 2 mm. long; lemma subterete, about 1 cm. long, scabrous, the nerves sometimes hispid, the awn 1 to 3 cm. long. ☉ —Moist or rocky woods, Newfoundland to Minnesota, south to Georgia, Louisiana, and Oklahoma. Plants with lemmas scabrous only toward the summit and on the nerves have been named *B. erectum* var. *septentrionale* Babel.



FIGURE 622.—A, *Heliochloa schoenoides*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Smith, Pa.) B, *H. alopecuroides*, $\times 5$. (Burk, Pa.)

88. MÍLIUM L.

Spikelets 1-flowered, disarticulating above the glumes; glumes equal,

obtuse, membranaceous, rounded on the back; lemma a little shorter than the glumes, obtuse, obscurely nerved,



FIGURE 623.—*Brachyelytrum erectum*. Plant, $\times \frac{1}{2}$; branchlet with glumes of two spikelets, and floret, $\times 5$.
(Bissell, Conn.)

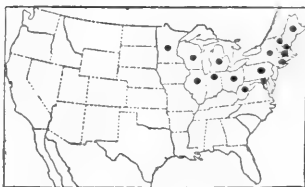
rounded on the back, dorsally compressed, in fruit becoming indurate, smooth and shining, the margins enclosing the lemma as in *Panicum*. Moderately tall grasses with flat blades and open panicles. Type

species, *Milium effusum*. *Milium*, old Latin name for millet.

1. *Milium effusum* L. (Fig. 624.) Smooth perennial, somewhat succulent; culms slender, erect from a bent base, 1 to 1.5 m. tall; blades mostly 10 to 20 cm. long, flat, lax, 8 to 15 mm. wide; panicle 10 to 20 cm. long, the slender branches in remote spreading or drooping pairs or fascicles, naked below; spikelets pale, 3 to 3.5 mm. long; glumes scaberulous. ♀ —Damp or rocky woods, Quebec and Nova Scotia to Minnesota, south to Maryland and Illinois; Eurasia. A handsome grass, sometimes cultivated as an annual.



FIGURE 624.—*Milium effusum*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Phillips, Maine.)



89. ORYZOPSIS Michx. RICEGRASS

Spikelets 1-flowered, disarticulating above the glumes; glumes about equal, obtuse to acuminate; lemma indurate, usually about as long as the glumes, broad, oval or oblong, nearly terete, usually pubescent, with a short, blunt, oblique callus, and a short deciduous, sometimes bent and twisted awn; palea enclosed by the edges of the lemma. Mostly slender perennials, with flat or often involute blades and terminal narrow or open panicles. Type species, *Oryzopsis asperifolia*. Name from *oruza*, rice, and *opsis*, appearance, alluding to a fancied resemblance to rice.

Nearly all the species are highly palatable to stock, but are usually not in sufficient abundance to be of importance, except *O. hymenoides* (Indian rice-grass), which is common in the arid and semiarid regions of the West and furnishes much feed. The seed has been used for food by the Indians. Locally important may be *O. micrantha* in the Black Hills region and *O. kingii* in the high Sierras. *O. miliacea* is cultivated for forage in California.

As the result of study of several species of *Oryzopsis* and *Stipa*, Johnson and Rogler¹³ conclude that the types of *Oryzopsis caduca* and *O. bloomeri* are hybrids between *O. hymenoides* and *Stipa viridula* and *O. hymenoides* and *S. occidentalis*, respectively. For these the generic name *Stiporyzopsis* is proposed. Other hybrids between *O. hymenoides* and six other species of *Stipa*—*S. elmeri*, *S. thurberiana*, *S. californica*, *S. scribneri*, *S. robusta*, and *S. columbiana*—are described, but not transferred to *Stiporyzopsis*.

Lemma smooth (rarely pubescent in *O. micrantha*).

Blades flat, 5 mm. wide or more. Spikelets numerous, about 3 mm. long.

1. *O. MILIACEA*.

Blades more or less involute, less than 2 mm. wide.

Panicle branches spreading or reflexed; fruit about 2 mm. long, pale.

2. *O. MICRANTHA*.

Panicle branches ascending or appressed; fruit about 4 mm. long, dark brown.

3. *O. HENDERSONI*.

Lemma pubescent.

Pubescence on lemma long and silky.

Panicle branches and the capillary pedicels divaricately spreading.

12. *O. HYMENOIDES*.

Panicle branches and pedicels erect or ascending.

Awn 6 mm. long; culms usually not more than 30 cm. tall..... 11. *O. WEBBERI*.

Awn 12 mm. long; culms 30 to 60 cm. tall..... 10. *O. BLOOMERI*.

Pubescence on lemma short, appressed.

Spikelets, excluding awn, 6 to 9 mm. long; blades flat.

Basal blades elongate, uppermost not more than 1 cm. long.... 8. *O. ASPERIFOLIA*.

Basal blades reduced, upper elongate..... 9. *O. RACEMOSA*.

Spikelets, excluding awn, 5 mm. long or less; blades involute or subinvolute.

Panicle branches erect or appressed.

Blades and panicle stiff, erect; awns about 5 mm. long..... 4. *O. EXIGUA*.

Blades flexuous, the panicle somewhat so; awns at least 10 mm. long.

7. *O. KINGII*.

Panicle branches loosely ascending or spreading.

Awn not more than 2 mm. long, straight or nearly so..... 5. *O. PUNGENS*.

Awn 10 to 20 mm. long, weakly twice-geniculate..... 6. *O. CANADENSIS*.

1. *Oryzopsis miliacea* (L.) Benth.
and Hook. ex Aschers. and Schweinf.
SMILO GRASS. (Fig. 625.) Culms rela-
tively stout, sometimes branching,
erect from a decumbent base, 60 to
150 cm. tall; ligule about 2 mm. long;

blades flat, 8 to 10 mm. wide; panicle
15 to 30 cm. long, loose, the branches
spreading with numerous short-pedi-
celed spikelets beyond the middle;
glumes acuminate, 3 mm. long; lem-

¹³ Amer. Jour. Bot. 30: 49-56. f. 1-40. 1943; JOHNSON, B. L., Amer. Jour. Bot. 32: 599-608. f. 1-71. 1945; Bot. Gaz. 107: 1-32. 1945.



FIGURE 625.—*Oryzopsis miliacea*, $\times 5$. (Kralik, Europe.)

ma smooth, 2 mm. long, the straight awn about 4 mm. long. ♀ — Introduced in California; ballast, Camden, N. J., and Philadelphia, Pa.; Mediterranean region.

2. *Oryzopsis micrantha* (Trin. and Rupr.) Thurb. LITTLESEED RICEGRASS. (Fig. 626.) Culms densely



FIGURE 626.—*Oryzopsis micrantha*. Panicle, $\times 1$; floret, $\times 5$. (Hitchcock 22993, N. Mex.)

tufted, erect, slender, 30 to 70 cm. tall; ligule about 1 mm. long; blades scabrous, flat or involute, 0.5 to 2 mm. wide; panicle open, 10 to 15 cm. long, the branches distant, single or in pairs, spreading or finally reflexed, 2 to 5 cm. long, with short-pedicelled appressed spikelets toward the ends; glumes thin, acuminate, 3 to 4 mm. long; lemma elliptic, glabrous, or rarely appressed-pilose, 2 to 2.5 mm. long, yellow or brown, the straight awn 5 to 10 mm. long. ♀ — Open dry woods and rocky slopes, medium altitudes, Saskatchewan to North Dakota and Montana, south to Nevada, New Mexico, Arizona, and California (Mohave Desert). The form with pilose lemmas is found from Colorado to Arizona.

3. *Oryzopsis hendersoni* Vasey. (Fig. 627.) Culms densely tufted, scabrous, 10 to 40 cm. tall; leaves mostly basal, the sheaths broad, papery, glabrescent; ligule very short; blades subfiliform, involute, scabrous, firm, mostly less than 10 cm. long, the one or two culm blades 4 to 5 cm. long; panicle few-flowered, 5 to 12 cm. long, the few scabrous branches appressed or ascending, spikelet-bearing toward the ends, the lower as much as 8 cm. long; spikelets short-pedicelled; glumes abruptly acute, 5 to 6 mm. long; lemma nearly as long as the glumes, glabrous, dark brown at maturity, the awn early deciduous, nearly straight, 6 to 10 mm. long. ♀ — Dry or gravelly soil. Known only from Mount Clements, Wash., and from the Ochoco National Forest, Oreg.

4. *Oryzopsis exigua* Thurb. LITTLE RICEGRASS. (Fig. 628.) Culms densely tufted, stiffly erect, scabrous, 15 to 30 cm. tall; sheaths smooth or somewhat scabrous; ligule 2 to 3 mm. long; blades involute-filiform, stiffly erect, scabrous, 5 to 10 cm. long, the culm blades about 2, shorter; panicle narrow, 3 to 6 cm. long, the branches appressed, the lower 1 to 2 cm. long; spikelets short-pedicelled, glumes abruptly acute, 4 mm. long;



FIGURE 627.—*Oryzopsis hendersoni*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Type.)

lemma appressed-pilose, about as long as the glumes, the awn about 5 mm. long, not twisted, geniculate. 2 —Dry open ground or open woods, at moderately high altitudes, Montana to Washington, south to Colorado, Nevada, and Oregon.

5. *Oryzopsis pungens* (Torr.) Hitchc. (Fig. 629.) Culms tufted, erect, slender, 20 to 50 cm. tall; blades elongate, slender, flat or involute, less than 2 mm. wide; panicle narrow, 3 to 6 cm. long, the branches erect or ascending or spreading in anthesis; spikelets long-pediceled; glumes 3 to 4 mm. long, obscurely 5-nerved, obtuse; lemma about as long as the glumes, rather densely pubescent, the awn usually 1 to 2 mm. long. 2 —Sandy or rocky soil, Labrador to British Columbia, south to Connecticut, Indiana, South Dakota, and Colorado.

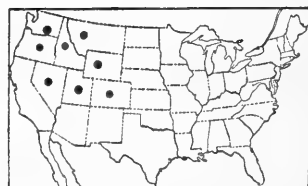


FIGURE 628.—*Oryzopsis exigua*. Panicle, $\times 1$; floret, $\times 5$. (Nelson 6511, Wyo.)

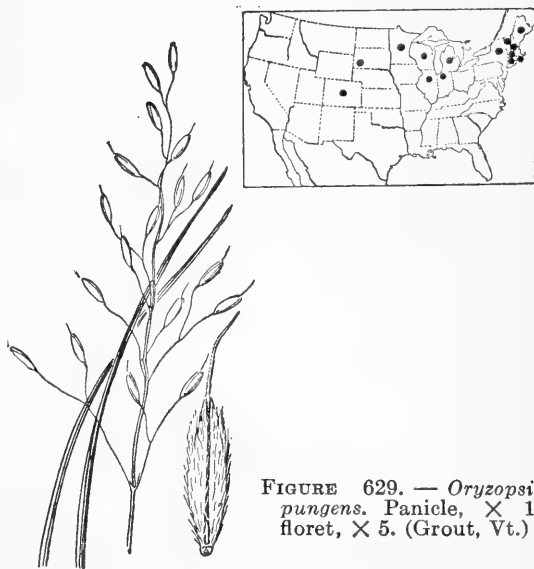


FIGURE 629. — *Oryzopsis pungens*. Panicle, $\times 1$; floret, $\times 5$. (Grout, Vt.)

6. *Oryzopsis canadensis* (Poir.) Torr. (Fig. 630.) Culms slender, tufted, erect, 30 to 70 cm. tall; ligule about 2 mm. long; blades flat



FIGURE 630.—*Oryzopsis canadensis*. Panicle, $\times 1$; floret, $\times 5$. (Rand, Maine.)

to involute, scabrous; panicle open, 5 to 10 cm. long, the slender flexuous branches ascending or spreading, naked below, few-flowered above; spikelets long-pedicelled; glumes 4 to 5 mm. long, abruptly acute; lemma about 3 mm. long, rather sparsely appressed-pilose, the awn 1 to 2 cm. long, weakly twice geniculate. 2 — Woods and thickets, Newfoundland to Alberta, south to New Hampshire, New York, West Virginia (Panther Knob, Pendleton County), northern Michigan, Wisconsin, northern Minnesota, and Wyoming.

7. *Oryzopsis kingii* (Boland.) Beal. (Fig. 631.) Culms tufted, slender, 20 to 40 cm. tall; leaves numerous at the base, the blades involute, filiform, flexuous; ligule about 1 mm. long; panicle narrow, loose, the short slender branches appressed or ascending, few-flowered; spikelets rather short-pedicelled; glumes broad, papery, nerveless, obtuse, purple at base, the first about 3.5 mm. long, the second a little longer; lemma elliptic, 3 to 3.5 mm. long, rather sparingly appressed-pubescent; awn bent in a wide curve or indistinctly geniculate below the middle, not twisted, minutely pubescent, about 12 mm. long, not readily deciduous. 2 — Meadows at upper altitudes, central Sierra Nevada, Calif.

8. *Oryzopsis asperifolia* Michx. (Fig. 632.) Culms tufted, the innovations erect, the fertile culms widely spreading or prostrate, 20 to 70 cm. long, nearly naked, the two or three sheaths bearing reduced or obsolete blades; basal blades erect, firm, scabrous, flat to somewhat revolute, elongate, 3 to 8 mm. wide, tapering toward each end, glaucous beneath; panicle nearly simple, rather few-flowered, 5 to 8 cm. long, the branches appressed; spikelets on appressed pedicels 3 to 6 mm. long; glumes 6 to 8 mm. long, somewhat obovate, about 7-nerved, abruptly pointed or apiculate; lemma about as long as the glumes, sparingly pubescent, more densely so on the callus, pale or yellowish at maturity, the awn 5 to 10 mm. long. 2 — Wooded slopes and dry banks, Newfoundland to British Columbia; Maine to West Virginia (Panther Knob, Pendleton



FIGURE 631.—*Oryzopsis kingii*. Plant, $\times 1$; floret $\times 5$. (Bolander 6097, Calif.)



FIGURE 632.—*Oryzopsis asperifolia*. Plant, $\times 1\frac{1}{2}$; spikelet and floret, $\times 5$. (Amer. Gr. Natl. Herb. 834, N. Y.)

County), Indiana to Idaho, south in the mountains to Utah and New Mexico.



FIGURE 633.—*Oryzopsis racemosa*. Panicle, $\times \frac{1}{2}$; floret, $\times 5$. (Sartwell, N. Y.)

9. *Oryzopsis racemosa* (J. E. Smith) Ricker. (Fig. 633.) Culms tufted, from a knotty rhizome, erect, 30 to 100 cm. tall; culm leaves several, the lowermost blades reduced, the others elongate, flat, 5 to 15 mm. wide, tapering at both ends, rather thin, scabrous above, pubescent beneath; panicle 10 to 20 cm. long, the branches distant, the lower spreading or reflexed at maturity, bearing a few spikelets toward the end; glumes 7 to 9 mm. long, about 7-nerved, abruptly acuminate; lemma slightly shorter than the glumes, sparsely pubescent, nearly black at maturity, the awn 1.5 to 2.5 cm. long, slightly flexuous. 2 —Rocky woods, Quebec to Minnesota and South Dakota, south to Virginia, Kentucky, and Iowa.

10. *Oryzopsis blooméri* (Boland.) Ricker. (Fig. 634.) Culms tufted, 30 to 60 cm. tall; leaves crowded at the base; ligule about 1 mm. long; blades

narrow, involute, firm; panicle 7 to 15 cm. long, the branches slender, rather stiffly ascending, the longer 5 to 7 cm. long, spikelet-bearing from about the middle; spikelets rather long-pediceled; glumes broad, indistinctly 3- to 5-nerved, rather abruptly acuminate, 8 to 10 mm. long; lemma elliptic, 5 mm. long, densely long-villous; awn about 12 mm. long, tardily deciduous, slightly twisted and appressed-villous below, weakly geniculate. 2 —Dry ground, medium altitudes, North Dakota to eastern Washington, south to New Mexico and California, rather rare.



FIGURE 634.—*Oryzopsis blooméri*. Panicle, $\times 1$; floret, $\times 5$. (Sandberg and Leiberg 231, Wash.)

11. *Oryzopsis webbéri* (Thurb.) Benth. ex Vasey. (Fig. 635.) Culms densely tufted, erect, 15 to 30 cm. tall; blades involute, filiform, scabrous; panicle narrow, 2.5 to 5 cm. long, the branches appressed; glumes about 8 mm. long, narrow, obscurely 5-nerved, minutely scaberulous, acuminate; lemma narrow, 6 mm. long, densely long-pilose, the awn about 6 mm. long, straight or bent, not

twisted. 2l —Deserts and plains, Idaho, Colorado, Nevada, and California.

12. *Oryzopsis hymenoides* (Roem. and Schult.) Ricker. INDIAN RICEGRASS. (Fig. 636.) Culms densely tufted, 30 to 60 cm. tall; ligule about 6 mm. long, acute; blades slender, involute, nearly as long as the culms; panicle diffuse, 7 to 15 cm. long, the slender branches in pairs, the branchlets dichotomous, all divaricately spreading, the ultimate pedicels capillary, flexuous; glumes about 6 to 7 mm. long, puberulent to glabrous, rarely hirsute, papery, ovate, 3- to 5-nerved, abruptly pointed; lemma fusiform, turgid, about 3 mm. long, nearly black at maturity, densely long-pilose with white hairs 3 mm. long; awn about 4 mm. long, straight, readily deciduous. 2l —Deserts and plains, medium altitudes, Manitoba to British Columbia, south to Texas, California, and northern Mexico.

ORYZOPSIS HYMENOIDES var. *CONTRACTA* B. L. Johnson. Panicles narrow, the branches ascending; lemmas less turgid and less copiously pilose. 2l —Dry soil, Wyoming.

***Nassella chilensis* (Trin. and Rupr.) E. Desv.** Slender tufted perennial; blades narrow, flat or loosely involute; panicle narrow, 3 to 5 cm. long, the few branches appressed, 1 to 1.5 cm. long; glumes 4 mm. long, awn-pointed; mature lemma flattish, obovate-oblong, gibbous at apex, smooth and shining, 2 mm. long; awn geniculate, 1 cm. long, soon deciduous. 2l (*N. major* (Trin. and Rupr.) E. Desv.)—Ballast, Portland, Oreg. Introduced from Chile.

90. PIPTOCHAÉTUM Presl

Spikelets 1-flowered, disarticulating above the glumes, the callus of the floret short, acutish, usually bearded; glumes about equal, broad, ovate, convex on the back, thin, abruptly acuminate; fruit brown or dark gray,

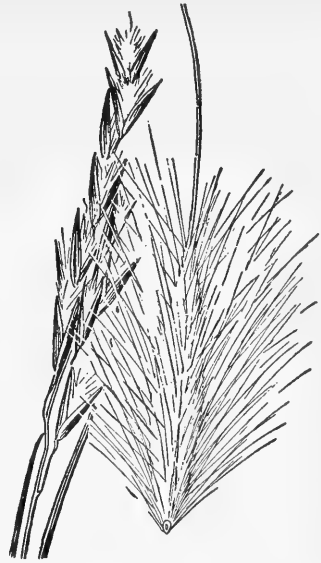


FIGURE 635.—*Oryzopsis webberi*. Panicle, $\times 1$; floret, $\times 5$. (Hillman, Nev.)

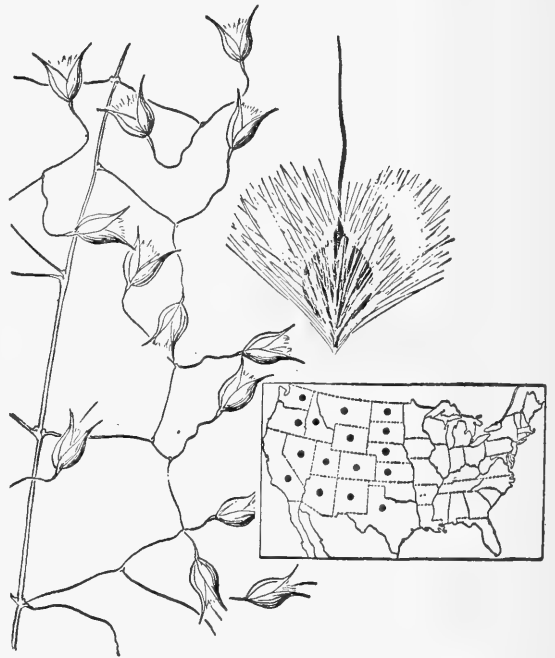


FIGURE 636.—*Oryzopsis hymenoides*. Panicle, $\times 1$; floret, $\times 5$. (Mearns 2583, Wyo.)

coriaceous, obovate, shorter than the glumes, glabrous or hispid above the callus, often minutely striate, sometimes tuberculate near the summit, the lemma turgid, usually somewhat compressed and keeled on the back, gibbous near the summit back of the awn, the edges not meeting but clasping the sulcus of the palea, the summit sometimes expanded into a crown; awn deciduous or persistent, curved,



FIGURE 637.—*Piptochaetium fimbriatum*. Plant, $\times \frac{1}{2}$; glumes, floret, and palea, $\times 5$. (Hitchcock 13511, N. Mex.)

flexuous or geniculate, often twisted below; palea narrow, indurate, except toward the margins, central keel consisting of two nerves and a narrow channel or sulcus between, the apex of the keel projecting above the summit of the lemma as a minute point. Tufted perennials with narrow usually involute blades and rather few-flowered panicles. Type species, *Piptochaetium setifolium* Presl. Name from Greek *piptein*, to fall, and *chaite*, bristle, alluding to the deciduous awns of the type species.

1. *Piptochaetium fimbriatum* (H. B. K.) Hitchc. PINYON RICEGRASS. (Fig. 637.) Culms densely tufted, erect, slender, 40 to 80 cm. tall; blades involute-filiform, flexuous, elongate; panicle open, 5 to 15 cm. long, the slender branches spreading,

few-flowered toward the ends; spikelets long-pedicelated; glumes about 5 mm. long, abruptly acuminate, 7-nerved; lemma a little shorter than the glumes, appressed-pubescent, especially on the callus, dark brown at maturity with a circular ridge at the base of the awn; awn weakly twice geniculate, 1 to 2 cm. long. 2 (*Oryzopsis fimbriata* Hemsl.)—Open rocky woods, Colorado to western Texas, Arizona, and Mexico. A fine forage grass. Specimens from the United States and most of those from northern Mexico have pale glumes (*P. fimbriatum* var. *confine* I. M. Johnston), while those of middle and southern Mexico have purple or brown glumes, as in the type of *P. fimbriatum*. In that, 1 panicle is open and 2 are narrow, as in var. *confine*.

91. STÍPA L. NEEDLEGRASS

Spikelets 1-flowered, disarticulating above the glumes, the articulation oblique, leaving a bearded, sharp-pointed callus attached to the base of the floret; glumes membranaceous, often papery, acute, acuminate, or even aristate, usually long and narrow; lemma narrow, terete, firm or indurate, strongly convolute, rarely the margins only meeting, terminating in a prominent awn, the junction of body and awn evident, the awn twisted below, geniculate, usually persistent; palea enclosed in the convolute lemma. Tufted perennials, with usually convolute blades and mostly narrow panicles. Type species, *Stipa pennata* L. Name from Greek *stupe*, tow, alluding to the feathery awns of the type species.

The species are for the most part valuable forage plants. Several, all western, such as *Stipa comata*, *S. occidentalis*, *S. lemmoni*, and *S. neomexicana*, are grazed chiefly when young. *Stipa lettermani* is important at high altitudes, in the mountains of the West; *S. columbiana* at medium altitudes; *S. viridula* in the Rocky Mountains; *S. pulchra*, *S. thurberiana*, and *S. speciosa* in California. Some of the species, when mature, particularly *S. spartea* and *S. comata*, are injurious, especially to sheep, because of the hard sharp points to the fruits which penetrate the skin. Sleepy grass, *S. robusta*, acts as a narcotic (see p. 458). One of the Old World species, *S. tenacissima* L., furnishes a part of the esparto or alfa grass of Spain and Algeria that is used in the manufacture of paper and cordage.

1a. Terminal segment of awn plumose.

Awn 12 to 18 cm. long..... 1. *S. NEOMEXICANA*.

Awn 1.2 to 1.5 cm. long..... 16. *S. PORTERI*.

1b. Terminal segment of awn not plumose, or somewhat plumose in *S. occidentalis*.

2a. First segment of the once-geniculate awn strongly plumose, the ascending hairs 5 to 8 mm. long..... 2. *S. SPECIOSA*.

2b. First segment of awn sometimes plumose but the hairs not more than 2 mm. long.

3a. Mature lemma 2 to 3 mm. long. Awn capillary, flexuous, about 5 cm. long.

34. *S. TENUISSIMA*.

3b. Mature lemma at least 5 mm. long.

- 1a. Lemma densely appressed-villous with white hairs 3 to 4 mm. long, rising above the summit in a pappuslike crown.
Culms 1 to 2 m. tall; spikelets about 2 cm. long; awns 4 to 5 cm. long.
5. *S. CORONATA*.
Culms not more than 50 cm. tall; spikelets less than 1 cm. long; awns about 2 cm. long..... 32. *S. PINETORUM*.
- 4b. Lemma often villous but the hairs not more than 1 mm. long, or sometimes those at the summit as much as 2 mm. long.
- 5a. Summit of mature lemma smooth, cylindric, whitish, forming a ciliate crown 0.5 to 1 mm. long (see also *S. pulchra*)..... 3. *S. LEUCOTRICA*.
- 5b. Summit of mature lemma not forming a crown.
- 6a. Lemma 2-lobed at summit, the lobes extending into awns 2 to 3 mm. long on each side of the central awn..... 4. *S. STILLMANII*.
- 6b. Lemma not lobed at summit or only obscurely so.
- 7a. Awn plumose below, the hairs ascending or spreading (compare *S. pulchra*, with appressed-hispid awn).
Awns once or obscurely twice-geniculate, hairs at summit of lemma longer.
23. *S. CURVIFOLIA*.
- Awns distinctly twice geniculate.
- Ligule 3 to 6 mm. long, hyaline..... 17. *S. THURBERIANA*.
- Ligule minute, mostly hairy.
- Lemma 8 to 10 mm. long; glumes firm..... 19. *S. LATIGLUMIS*.
- Lemma 6 to 8 mm. long; glumes thin.
- Hairs on upper part of lemma longer than those below; culms 60 to 125 cm. tall.
- Sheaths pubescent..... 18. *S. ELMERI*.
- Sheaths glabrous..... 22. *S. CALIFORNICA*.
- Hairs short all over the lemma; culms 25 to 40 cm. tall.
20. *S. OCCIDENTALIS*.
- 7b. Awn scabrous or nearly glabrous, rarely appressed-hispid, not plumose.
- 8a. Lemma more than 7 mm. (often 1 to 2 cm.) long, glabrous or sparsely pubescent above the callus, mostly cylindric (somewhat fusiform in *S. pulchra*).
Mature lemma pale or finally brownish, sparsely pubescent to summit, mostly more than 1 cm. long..... 10. *S. COMATA*.
- Mature lemma dark.
- Lemma 8 to 10 mm. long.
- Glumes 3-nerved; summit of lemma hispidulous-ciliate, the hairs erect, nearly 1 mm. long.
- Lemma slender, cylindric; basal blades usually numerous, narrow, involute, glaucous, pilose..... 12. *S. CERNUA*.
- Lemma fusiforme; blades green..... 11. *S. PULCHRA*.
- Glumes 5- to 9-nerved.
- Lemmas glabrous above the base, minutely roughened at apex; callus with fine sharp point..... 8. *S. AVENACEA*.
- Lemmas sparsely pubescent to apex; callus rather blunt.
13. *S. PRINGLEI*.
- Lemma 12 to 25 mm. long, cylindric.
- Mature lemma glabrous above the callus..... 7. *S. AVENACIOIDES*.
- Mature lemma more or less pubescent above the callus.
9. *S. SPARTEA*.
- 8b. Lemma less than 7 mm. long, or if as long as 7 to 8 mm., distinctly pubescent on the upper part (see also *S. cernua*).
- Panicle open, the branches spreading or ascending, naked at base.
- Panicle diffuse, the branches divergent, drooping; lemma about 5 mm. long; awn about 2 cm. long..... 6. *S. RICHARDSONI*.
- Panicle open but not diffuse.
- Ligule 3 to 6 mm. long; awn about 5 cm. long, the terminal segment flexuous..... 14. *S. EMINENS*.
- Ligule 1 mm. long or less; awn 2.5 to 4 cm. long..... 15. *S. LEPIDA*.
- Panicle narrow, the branches appressed.
- Hairs on lemma copious, at least at summit, 2 mm. long.
- Lemmas evenly villous all over; summit with lobes 0.8 to 1.5 mm. long..... 21. *S. LOBATA*.
- Lemmas conspicuously villous above, less so below; summit not lobed or obscurely so.
- Lemma about 8 mm. long, villous at summit, pubescent below.
24. *S. SCRIBNERI*.

Lemma about 5 mm. long, villous all over but more so above.

32. *S. PINETORUM*.

Hairs not copious, usually not more than 1 mm. long at summit.

Glumes broad, abruptly acuminate, rather firm, the first 5-nerved.

25. *S. LEMMONI*.

Glumes narrow, gradually acuminate, usually hyaline, the first usually 3-nerved.

Awn 4 to 6 cm. long, obscurely geniculate, the terminal segment flexuous..... 33. *S. ARIDA*.

Awn mostly less than 5 cm. long, if as much as 4 cm. long, twice-geniculate and the terminal segment straight or nearly so.

Sheaths, at least the lowermost, pubescent.

30. *S. WILLIAMSII*.

Sheaths glabrous.

Sheaths villous at the throat; fruit rather turgid, the callus broad and short; lower nodes of panicle villous.

Glumes thin, papery; plants rather slender, mostly less than 1 m. tall; panicle rather slender, loose.

26. *S. VIRIDULA*.

Glumes firm, the nerves inconspicuous; plants robust, mostly more than 1 m. tall; panicle larger, more compact..... 27. *S. ROBUSTA*.

Sheaths not villous at the throat or only slightly so; fruit slender, the callus narrow, sharp-pointed; nodes of panicle glabrous or nearly so.

Culms densely pubescent below the nodes.

31. *S. DIEGOENSIS*.

Culms glabrous throughout.

Awn mostly more than 2 cm. long; hairs at summit of lemma about as long as the others.

28. *S. COLUMBIANA*.

Awn mostly less than 2 cm. long; hairs at summit of lemma longer than those on the body, 1 to 1.5 mm. long..... 29. *S. LETTERMANI*.

1. *Stipa neomexicana* (Thurb.)

Scribn. NEW MEXICAN FEATHER-GRASS. (Fig. 638.) Culms mostly 40 to 80 cm. tall; sheaths glabrous or the lower minutely pubescent; ligule very short, ciliate; blades slender, firm, convolute, glabrous beneath, the basal 10 to 30 cm. long, scarcely 1 mm. wide when unrolled; panicle narrow, 3 to 10 cm. long; spikelets pale, more or less shining; glumes 3 to 5 cm. long, tapering to a fine point; lemma about 15 mm. long including the pilose callus 4 to 5 mm. long; awn readily deciduous, 12 to 18 cm. long, the lower one-fourth to one-third straight, strongly twisted, appressed-villous, the middle segment 1 to 2 cm. long, the terminal segment flexuous, plumose, the hairs about 3 mm. long. 24 —Mesas, canyons, and rocky slopes, western Texas, Oklahoma, Wyoming, and Colorado to Utah and Arizona.



FIGURE 638.—*Stipa neomexicana*. Plant, $\times \frac{1}{2}$; lemma, $\times 5$. (Jones 5377, Utah.)



FIGURE 639.—*Stipa speciosa*. Panicle, $\times \frac{1}{2}$; floret, $\times 5$. (Reed 4853, Calif.)

2. *Stipa speciosa* Trin. and Rupr.
DESERT NEEDLEGRASS. (Fig. 639.) Culms numerous, 30 to 60 cm. tall; sheaths brownish, smooth or the lower pubescent or even felty at the very base, the throat densely short-villous; ligule short; blades elongate, involute-filiform, mostly basal, more or less deciduous from the outer and older persistent sheaths; panicle narrow, dense, 10 to 15 cm. long, not much exceeding the leaves, white or tawny, feathery from the plumose awns; glumes smooth, 14 to 16 mm. long, 3-nerved, long-acuminate, papery; lemma 7 to 9 mm. long, narrow, densely short-pubescent, the callus sharp and smooth below; awn with one sharp bend, the first section 1.5 to 2 cm. long, densely long-pilose on the lower two-thirds or more, the hairs 5 to 8 mm. long, the remaining portion of the awn scabrous, the second segment about 2.5 cm. long. 2 — Deserts, canyons, and rocky hills, Colorado and Arizona to southern California; southern South America.

3. *Stipa leucotricha* Trin. and Rupr. **TEXAS NEEDLEGRASS.** (Fig. 640.) Culms 30 to 60 cm. tall, the nodes

pubescent; blades 10 to 30 cm. long, flat, often becoming involute, hispidulous beneath, 2 to 4 mm. wide; panicle narrow, mostly not more than 10 cm. long; glumes 12 to 18 mm. long; lemma about 1 cm. long, the slender callus about 4 mm. long, the body oblong, brownish, appressed-pubescent on the lower part, papillose-roughened at least toward the summit, abruptly narrowed into a cylindric smooth neck about 1 mm. long, the crown ciliate with short stiff hairs; awn 6 to 10 cm. long, rather stout, twice-geniculate, the first segment hispidulous, twisted, 2 to 3.5 cm. long. 2 — Dry, open grassland, Oklahoma and Texas to central Mexico. Cleistogamous spikelets with glumes obsolete and lemma nearly awnless are borne in basal sheaths just after maturity of panicle.

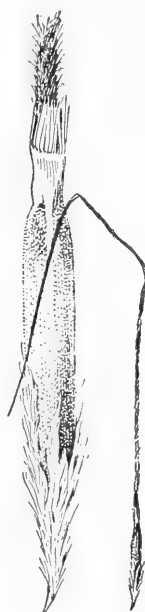


FIGURE 640.—*Stipa leucotricha*. Floret, $\times 1$; lemma, $\times 5$. (Hitchcock 5138, Tex.)



FIGURE 641.—*Stipa stillmanii*. Floret, $\times 1$; lemma, $\times 5$. (Bolander, Calif.)

4. *Stipa stillmanii* Boland. (Fig. 641.) Culms stout, 60 to 100 cm. tall; sheaths smooth, puberulent at the throat and collar; ligule very short; blades elongate, scattered, folded or involute, firm, the uppermost filiform; panicle 10 to 20 cm. long, narrow, dense or interrupted at

base, the branches short, fascicled; glumes equal, 14 to 16 mm. long, papery, minutely scabrous, acuminate into a scabrous awn-point, the first 3-nerved, the second 5-nerved; lemma 9 mm. long, short-pilose, bearing 2 slender teeth at the apex, the callus short; awn about 2.5 cm. long, once- or indistinctly twice-geniculate, scabrous. ♀ —Rocky slopes, Sierra Nevada, from Lassen National Forest to Tahoe National Forest, Calif.; apparently rare.

5. *Stipa coronata* Thurb. (Fig. 642.) Culms stout, 1 to 2 m. tall, as much as 6 mm. thick at base, smooth or pubescent below the nodes; sheaths smooth, the margin and throat villous; ligule about 2 mm. long, ciliate; blades elongate, 4 to 6 mm. wide, flat to subinvolute with a slender involute point; panicle 30 to 40 cm. long, contracted, erect, purplish; glumes gradually acuminate, 3-nerved, the first about 2 cm. long, the second 2 to 4 mm. shorter; lemma about 8 mm. long, densely villous with long appressed hairs 3 to 4 mm. long; awn usually 4 to 5 cm. long, scabrous, twice-geniculate, the first and second segments about 1 cm. long. ♀ —Open ground in the Coast Range, California, from Monterey to Baja California; Grand Canyon, Ariz.

STIPA CORONATA var. *DEPAUPERATA* (Jones) Hitchc. Culms usually 30 to 50 cm. tall; blades 10 to 20 cm. long; panicle 10 to 15 cm. long, rather few-

flowered, the spikelets commonly smaller than in the species, the lemma 6 to 7 mm. long, the awn about 2.5 cm. long, once-geniculate, the first segment twisted and scabrous-pubescent, about 1 cm. long, the second segment bent about horizontally. ♀ —Dry or rocky slopes, Utah and Nevada to Arizona and southern California. Many intermediates occur between the variety and the species.

6. *Stipa richardsóni* Link. *RICHARDSON NEEDLEGRASS.* (Fig. 643.) Culms 50 to 100 cm. tall; blades mostly basal, usually 15 to 25 cm. long, involute, subfiliform, scabrous; panicle 10 to 20 cm. long, open, the



FIGURE 642.—*Stipa coronata*. Floret, $\times 1$; lemma $\times 5$. (Orcutt 1068, Calif.)



FIGURE 643.—*Stipa richardsoni*. Panicle, $\times \frac{1}{2}$; floret, $\times 1$; lemma, $\times 5$. (Hitchcock 11468, Alberta.)

branches slender, distant, spreading or drooping, naked below; glumes 8 to 9 mm. long; lemma about 5 mm. long, subfusiform, brown at maturity; awn 2.5 to 3 cm. long. 2 — Bottom lands and wooded slopes, Saskatchewan to South Dakota, Colorado, Idaho, and British Columbia.

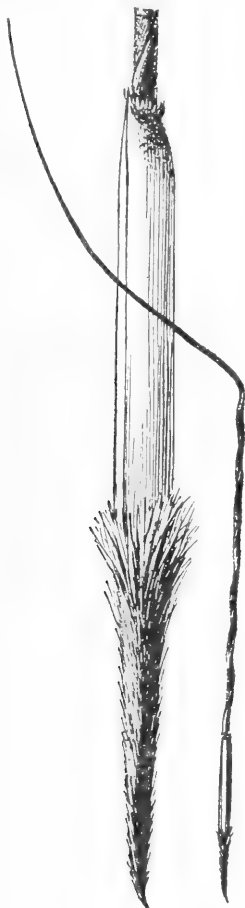


FIGURE 644.—*Stipa avenacioides*. Floret, $\times 1$; lemma, $\times 5$. (Curtiss 5834, Fla.)

7. *Stipa avenacioides* Nash. (Fig. 644.) Culms about 1 m. tall; ligule 2 to 3 mm. long; blades elongate, involute, subfiliform; panicle 10 to 25 cm. long, open, the branches slender, spreading, naked below; glumes about 2 cm. long; lemma brown, linear, 1.5 to 2 cm. long including the callus 7 mm. long, the body glabrous, minutely papillose at the slightly contracted summit, slightly hispidulous on the crown; awn 8 to 11 cm. long, scabrous, twice geniculate. 2 — Dry pine woods, peninsular Florida.

8. *Stipa avenacea* L. BLACKSEED NEEDLEGRASS. (Fig. 645.) Culms 60 to 100 cm. tall; ligule about 3 mm. long; blades 20 to 30 cm. long, 1 mm. wide, flat or involute; panicle 10 to 15 cm. long, open, the slender branches 2 to 4 cm. long, bearing 1 or 2 spikelets; glumes 1.5 cm. long; lemma dark brown, 9 to 10 mm. long, the callus 2 mm. long, the body glabrous, papillose-roughened toward the summit, awn scabrous, 4.5 to 6 cm. long, twice-geniculate. 2 — Dry or rocky open woods, Massachusetts to Michigan south to Florida and Texas, mostly on the Coastal Plain.



FIGURE 645.—*Stipa avenacea*. Floret, $\times 1$; lemma, $\times 5$. (Kneucker, Gram. 564, Md.)

9. *Stipa spártea* Trin. PORCUPINE GRASS. (Fig. 646.) Culms about 1 m. tall; ligule rather firm, 4 to 5 mm. long; blades 20 to 30 cm. long, 3 to 5 mm. wide, flat, involute in drying; panicle 15 to 20 cm. long, narrow, nodding, the few slender branches bearing 1 or 2 spikelets; glumes 3 to 4 cm. long; lemma subcylindric, brown, 1.6 to 2.5 cm. long, the callus about 7 mm. long, the body pubescent below, glabrous above except for a line of pubescence on one side, the crown erect-ciliate; awn stout, 12 to 20 cm. long, twice geniculate. 2 — Prairies, Ontario to British Columbia; Pennsylvania to Montana, Missouri, and New Mexico. *STIPA SPARTEA* var. *CURTISÉTA* Hitchc. Glumes



FIGURE 646.—*Stipa spartea*. Plant, $\times \frac{1}{2}$; glumes and floret, $\times 2$. (McDonald 16, Ill.)

2 to 3 cm. long; lemma 12 to 15 mm. long; awn mostly not more than 7 or 8 cm. long. 2 —Manitoba to Alberta, Montana, South Dakota, and Wyoming.

10. *Stipa comata* Trin. and Rupr. NEEDLE-AND-THREAD. (Fig. 647.) Culms 30 to 60 cm. tall, sometimes

ington with pubescent foliage has been differentiated as *S. comata* var. *intonsa* Piper. *STIPA COMATA* var. *INTERMÉDIA* Scribn. and Tweedy. Differing from *S. comata* in the shorter straight third segment of the awn; glumes and lemma on the average a little longer; panicle usually exserted.



FIGURE 647.—*Stipa comata*. Panicle, $\times \frac{1}{2}$; lemma, $\times 5$. (Hitchcock 1700, Colo.)

taller; ligule thin, 3 to 4 mm. long; blades 10 to 30 cm. long, 1 to 2 mm. wide, flat or involute, panicle commonly included at base, narrow, 10 to 20 cm. long; glumes 1.5 to 2 cm. long, the attenuate tips subhyaline; lemma 8 to 12 mm. long, mostly about 1 cm., pale or finally brownish, the callus about 3 mm. long, the body sparsely pubescent or glabrate toward the summit; awn 10 to 15 cm. long, indistinctly twice-geniculate, very slender, loosely twisted below, flexuous above, often deciduous. 2 —Prairies, plains, and dry hills, Indiana to Yukon Territory, south to Texas and California. A form from Wash-



FIGURE 648.—*Stipa pulchra*. Panicle, $\times \frac{1}{2}$; lemma, $\times 5$. (Chase 5598, Calif.)

—Canada; Montana to Washington, south to New Mexico and California.

11. *Stipa pulchra* Hitchc. PURPLE NEEDLEGRASS. (Fig. 648.) Culms 60 to 100 cm. tall; blades long, narrow, flat or involute; ligule about 1 mm. long; panicle nodding, about 15 to 20 cm. long, loose, the branches spreading, slender, some of the lower 2.5 to 5 cm. long; glumes narrow, long-acuminate, purplish, 3-nerved, the first about 20 mm. long, the second 2 to 4 mm. shorter; lemma 7.5 to 13 mm. long, fusiform, sparingly pilose, sometimes only in lines above, minutely papillose-roughened, the callus about 2 mm. long, the summit some-

times with a smooth neck and a ciliate crown (as in *S. leucotricha*); awn 7 to 9 cm. long, short-pubescent to the second bend, the first segment 1.5 to 2 cm. long, the second shorter, the third 4 to 6 cm. long. 2 — Open ground, northern California to Baja California, mostly in the Coast Ranges.



FIGURE 64. — *Stipa cernua*. Glumes and floret, $\times 5$. (Hall 2921, Calif.)

12. *Stipa cernua* Stebbins and Love. (Fig. 649.) Culms mostly 60 to 90 cm. tall, in rather large clumps; basal blades numerous, narrow, glaucous, those of the culm 1.2 to 2.4 mm. wide; panicle open with slender flexuous branches; glumes acuminate, the first 12 to 19 mm. long, the second a little shorter; lemma 5 to 10.5 mm. long, papillose, silky-pilose below and on the nerves, the callus acute, densely bearded; awn 6 to 11 cm. long, the terminal segment flexuous. 2 — Foothills of Sierra Nevada and Coast Ranges, Calif.

13. *Stipa pringlei* Scribn. PRINGLE NEEDLEGRASS. (Fig. 650.) Culms, about 1 m. tall; ligule about 2 mm. long; blades 10 to 30 cm. long, 1 to 3 mm. wide, flat or those of the innovations involute, firm, erect, scabrous, panicle nodding, 10 to 15 cm. long,

the branches ascending, few-flowered, naked below; glumes about 1 cm. long, broad, rather abruptly narrowed into a short point, 7- to 9-nerved; lemma 7 to 8 mm. long, oblong-elliptic, brown, minutely papillose and brownish pubescent, the callus 1 mm. long; awn about 3 cm. long, obscurely twice-geniculate. 2

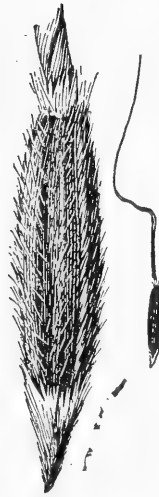


FIGURE 650. — *Stipa pringlei*. Floret, $\times 1$; lemma, $\times 5$. (Hitchcock 7691, Mexico.)

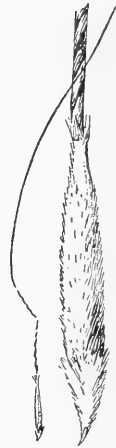


FIGURE 651. — *Stipa eminens*. Floret, $\times 1$; lemma, $\times 5$. (Palmer 523, Mexico.)

—Rocky woods and slopes, Texas, New Mexico, and Arizona to Chihuahua, Mex.

14. *Stipa éminens* Cav. (Fig. 651.) Culms slender, rather wiry, 80 to 120 cm. tall; ligule 3 to 6 mm. long; blades mostly elongate, flat or involute, 1 to 4 mm. wide; panicle nodding, open, 10 to 20 cm. long, usually densely pilose on the lower node, the branches slender, spreading, often flexuous, usually 3 to 4 or even more at the node; glumes about 1.5 cm. long; lemma pale, 5 to 7 mm. long, pubescent; awn 3 to 6 cm. long, obscurely twice-geniculate, the third segment flexuous. 2 — Rocky hills, Texas to Arizona and central Mexico.

15. *Stipa lépida* Hitchc. FOOTHILL NEEDLEGRASS. (Fig. 652.) Culms slender, puberulent below the nodes, 60



FIGURE 652.—*Stipa lepida*. Floret, $\times 1$; lemma, $\times 5$. (Chase 5609, Calif.)



FIGURE 653.—*Stipa porteri*. Floret, $\times 1$; lemma, $\times 5$. (Wolf 1109, Colo.)

to 100 cm. tall; sheaths smooth, rarely puberulent, sparingly villous at throat; ligule very short; blades 10 to 30 cm. long, flat, 2 to 4 mm. wide, pubescent on upper surface near base; panicle rather loose and open, usually 15 to 20 cm. long, sometimes more than 30 cm. long, the branches distant, slender; glumes 3-nerved, smooth, acuminate, the first 6 to 10 mm. long, the second about 2 mm. shorter; lemma about 6 mm. long, brown, sparingly villous, nearly glabrous toward the hairy-tufted apex; awn indistinctly twice-geniculate, about 2.5 to 4 cm. long, scabrous. 2 — Dry hills, open woods, and rocky slopes, central California to Baja California, in the Coast Range. *STIPA LEPIDA* var.

ANDERSÓNI (Vasey) Hitchc. Differing only in the more slender culms, the slender involute blades, and in the narrow or reduced panicle.—Same range as the species.

16. *Stipa porteri* Rydb. (Fig. 653.) Culms 20 to 35 cm. tall; ligule 2 to 3 mm. long; blades 2 to 12 cm. long, involute, subfiliform, sulcate, scaberulous; panicle mostly 5 to 10 cm. long, open, the branches distant, capillary, flexuous, few-flowered; glumes 5 to 6 mm. long; lemma about 5 mm. long, oblong-elliptic, softly pilose on the lower half, scaberulous above, lobed at summit; awn 12 to 15 mm. long, plumose with hairs 1



FIGURE 655.—*Stipa elmeri*. Floret, $\times 1$; lemma, $\times 5$. (Hitchcock 3336, Calif.)

to 2 mm. long, with a single bend one-third from the base, the first segment weakly twisted. 2 — High mountains of Colorado.

17. *Stipa thurberiana* Piper. THURBER NEEDLEGRASS. (Fig. 654.) Culms mostly 30 to 60 cm. tall; sheaths scaberulous or the upper glabrous; ligule hyaline, 3 to 6 mm. long; blades 10 to 25 cm. long, filiform, involute, scabrous to densely soft-pubescent, flexuous; panicle mostly 8 to 15 cm. long, narrow, the ascending branches few flowered; glumes 11 to 13 mm. long, the acuminate summit hyaline; lemma 8 to 9 mm. long, appressed-pubescent, callus about 1 mm. long; awn 4 to 5 cm. long, twice-geniculate, the first and second segments plumose with



FIGURE 654.—*Stipa thurberiana*. Floret, $\times 1$; lemma, $\times 5$. (Chase 4689, Idaho.)

hairs 1 to 2 mm. long. 2 —Mesas and rocky slopes, Idaho to Washington and central California.

18. *Stipa elméri* Piper and Brodie ex Scribn. (Fig. 655.) Culms 60 to 100 cm. tall, more or less puberulent, especially at the nodes; sheaths pubescent; ligule very short; blades 15 to 30 cm. long, 2 to 4 mm. wide, flat or becoming involute, pubescent on the upper surface, or those of the innovations also on the lower surface; panicle narrow, 15 to 35 cm. long, rather loose; glumes 12 to 14 mm. long, long-acuminate, hyaline except toward base; lemma about 7 mm. long, appressed-pubescent, the

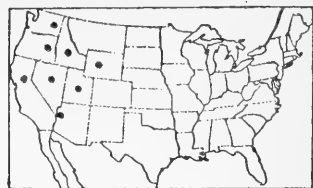


FIGURE 657.—*Stipa occidentalis*. Panicle, $\times \frac{1}{2}$; lemma, $\times 5$. (Hitchcock 11740, Oreg.)



FIGURE 656.—*Stipa latiglumis*. Floret, $\times 1$; lemma, $\times 5$. (Type.)

callus 1 mm. long; awn 4 to 5 cm. long, distinctly twice-geniculate, the segments nearly equal, the first and second finely plumose. 2 —Dry hills, sandy plains, and open woods, Washington and Idaho to California and Nevada.

19. *Stipa latiglumis* Swallen. (Fig. 656.) Culms slender, erect, strigose below, 50 to 110 cm. tall; sheaths, at least the lower, pubescent; blades flat or loosely involute, pilose on the upper surface, glabrous beneath; ligule 1 to 4 mm. long; panicle narrow, loosely flowered, 15 to 30 cm. long, the branches distant, slender, the

lower as much as 10 cm. long; glumes about equal, firm, rather abruptly acute or acuminate, 3-nerved, tinged with purple, 13 to 15 mm. long, 1.5 mm. wide from keel to margin; lemma densely pubescent, 8 to 9 mm. long, the sharp callus 1 mm. long; awn twice-geniculate, 3.5 to 4.5 cm. long, the first and second segments plumose. 2 —Sierras of central California at medium altitudes.

20. *Stipa occidentalis* Thurb. WESTERN NEEDLEGRASS. (Fig. 657.) Culms mostly 25 to 40 cm. tall;



FIGURE 658.—*Stipa lobata*. Floret, $\times 1$; lemma, $\times 5$; summit of lemma, $\times 15$. (Type.)



FIGURE 659.—*Stipa californica*. Floret, $\times 1$; lemma, $\times 5$. (Hall 2356, Calif.)

sheaths glabrous to pubescent; blades 10 to 20 cm. long, 1 to 2 mm. wide, usually involute, glabrous beneath, white-puberulent on the upper surface; panicle 10 to 20 cm. long, lax, the few slender branches narrowly ascending; glumes about 12 mm. long, the attenuate tips hyaline; lemma pale brown, about 7 mm. long, rather sparsely appressed-pubescent; awn 3 to 4 cm. long, twice-geniculate, plumose, the hairs on first and second segments about 1 mm. long, shorter on third segment. ♀ —Plains, rocky hills, and open woods, Wyoming to Washington, Arizona, and California.

21. *Stipa lobáta* Swallen. (Fig. 658.) Culms densely tufted, erect, scaberulous below the panicle, 35 to 85 cm. tall; blades flat or loosely folded toward the base, tapering into a fine point, as much as 50 cm. long, 1 to 4 mm. wide at the base, scabrous on the upper surface, glabrous beneath; ligule less than 0.5 mm. long; panicle narrow, 10 to 18 cm. long, the branches appressed; glumes about equal, acuminate, 3-nerved, scabrous, 9 to 10 mm. long; lemma brownish, 6 mm. long, densely pubescent with hairs 1 to 2 mm. long, the callus very short, blunt, the summit 2-lobed, the lobes 0.8 to 1.5 mm. long, awned from between the lobes; awn

twice-geniculate, 12 to 16 mm. long, the first and second segments appressed-hispid. ♀ —Rocky hills at medium altitudes, western Texas and New Mexico.

22. *Stipa californica* Merr. and Davy. (Fig. 659.) Culms 75 to 125 cm. tall; ligule rather firm, 1 to 2 mm. long; blades 10 to 25 cm. long, 1 to 4 mm. wide, flat, becoming involute, those of the innovations slender and involute; panicle 15 to 30 cm., sometimes to 50 cm., long, slender, pale; glumes about 12 mm. long; lemma 6 to 8 mm. long, rather sparsely villous with ascending white hairs, those at the summit about 1.5 mm. long; awn 2.5 to 3.5 cm. long, twice-geniculate, the first and second segments plumose. ♀ —Dry open ground, Idaho and Washington to California and western Nevada.



FIGURE 660.—*Stipa curvifolia*. Floret, $\times 1$; lemma, $\times 5$. (Type.)

23. *Stipa curvifolia* Swallen. (Fig. 660.) Culms densely tufted, erect, about 35 cm. tall; leaves clustered toward the base, the lowermost sheaths pubescent, the blades involute, becoming curved with age; panicle 7 to 8 cm. long, dense, the branches short, appressed; glumes about 10 mm. long; lemma 5.5 mm. long, light brown, evenly white pilose; awn once or obscurely twice-geniculate, 22 to 25 mm. long, twisted and densely plumose below the bend.

24 —Known only from limestone cliffs, Guadalupe Mountains, N. Mex.

24. *Stipa scribnéri* Vasey. SCRIBNER NEEDLEGRASS. (Fig. 661.) Culms 30 to 70 cm. tall; sheaths villous at the throat; ligule less than 1 mm. long; blades 15 to 25 cm. long, 2 to 4 mm. wide, flat or sometimes involute; panicle 10 to 25 cm. long, contracted, the rather short stiff branches erect; glumes 10 to 15 mm. long, relatively firm, attenuate; lemma about 8 mm. long, pale, narrow-fusiform, villous with white hairs, those at the summit about 2 mm. long, forming a brushlike tip; awn 14 to 20 mm. long, twice-geniculate. 24 —Mesas and rocky slopes, Colorado, Utah, New Mexico, and Arizona.

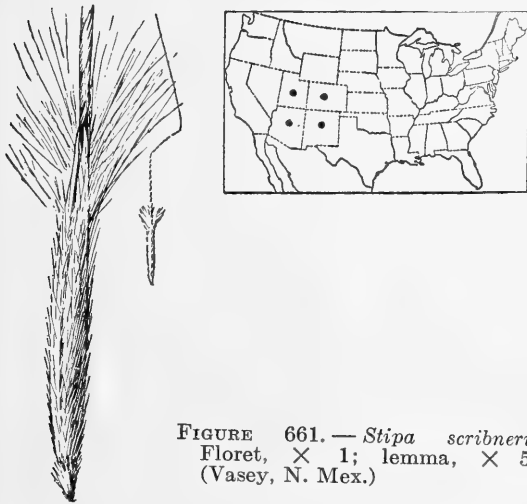


FIGURE 661.—*Stipa scribnéri*. Floret, $\times 1$; lemma, $\times 5$. (Vasey, N. Mex.)

25. *Stipa lemmóni* (Vasey) Scribn. LEMMON NEEDLEGRASS. (Fig. 662.) Culms 30 to 80 cm. tall, scaberulous, usually puberulent below the nodes; ligule 1 to 3 mm. long; blades 10 to 20 cm. long, flat or involute, 1 to 2 mm. wide, or those of the innovations very narrow; panicle 5 to 12 cm. long, narrow, pale or purplish; glumes 8 to 10 mm. long, rather broad and firm, somewhat abruptly acuminate, the first 5-nerved, the second 3-nerved; lemma 6 to 7 mm. long, pale or light brown, the callus rather blunt, the body fusiform, 1.2 mm. wide, villous with appressed hairs; awn 20 to 35 mm. long, twice-geniculate, appressed-pubescent to

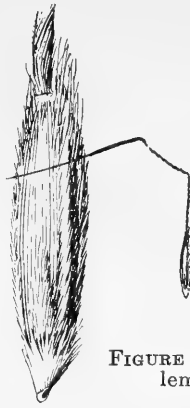


FIGURE 662.—*Stipa lemmóni*. Floret, $\times 1$; lemma, $\times 5$. (Butler 830, Calif.)

the second bend. 24 —Dry open ground and open woods, British Columbia to Idaho and California.

26. *Stipa virídula* Trin. GREEN NEEDLEGRASS. (Fig. 663.) Culms 60 to 100 cm. tall; sheaths villous at the throat, often rather sparingly so, more or less hispidulous in a line across the collar; ligule about 1 mm. long; blades 10 to 30 cm. long, 1 to 3 or even 5 mm. wide, flat or, especially on the innovations, involute; panicle 10 to 20 cm. long, narrow, rather closely flowered, greenish or tawny at maturity; glumes 7 to 10 mm. long, hyaline-attenuate; lemma 5 to 6 mm. long, fusiform, at maturity plump, more than 1 mm. wide, the body at maturity brownish, appressed-pubescent, the callus rather blunt; awn 2 to 3 cm. long, twice-geniculate. 24 —Plains and dry slopes, Alberta and Saskatchewan to Wisconsin and Illinois, west to Montana and Arizona; New York (near Rochester); east of the Mississippi, found near railways.

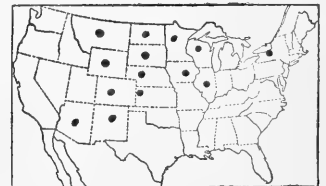


FIGURE 663.—*Stipa virídula*. Floret, $\times 1$; lemma and summit of sheath, $\times 5$. (Griffiths 201, S. Dak.)



FIGURE 664.—*Stipa robusta*. Panicle, $\times \frac{1}{2}$; lemma, $\times 5$. (Hitchcock 13280, N. Mex.)

27. *Stipa robusta* (Vasey) Scribn. SLEEPY GRASS. (Fig. 664.) Culms robust, mostly 1 to 1.5 m. tall; sheaths villous at the throat and on the margin, a strong hispidulous line across the collar; ligule 2 to 4 mm. long; blades elongate, flat or on the innovations involute, those of the culm as much as 8 mm. wide; panicle narrow, compact, often more or less interrupted below, as much as 30 cm. long and 2 cm. thick; glumes about 1 cm. long, attenuate into a fine soft point; lemma 6 to 8 mm. long, about as in *S. viridula*; awn 2 to 3 cm. long, rather obscurely twice-geniculate. ♀ (*S. vaseyi* Scribn.)—Dry plains and hills and dry open woods, Colorado to western Texas, Arizona, and northern Mexico. Said to act as a narcotic on animals that graze upon it, especially affecting horses.

28. *Stipa columbiána* Macoun. COLUMBIA NEEDLEGRASS. (Fig. 665.) Culms mostly 30 to 60 cm. tall, sometimes as much as 1 m.; sheaths naked at the throat; ligule 1 to 2 mm. long; blades 10 to 25 cm. long, 1 to 3 mm. wide, mostly involute, especially on the innovations, those of the culm sometimes flat; panicle 7 to 20 cm. long, narrow, mostly rather dense, often purplish; glumes about 1 cm. long; lemma 6 to 7 mm. long, pubescent as in *S. viridula*, the body narrower, the callus sharper; awn 2 to 2.5 cm. long, twice-geniculate.

late. ♀ (*S. minor* Scribn.)—Dry plains, meadows, and open woods, at medium and high altitudes, South Dakota to Yukon Territory, south to Texas and California. Differing from *S. viridula* in the glabrous throat of the sheath and in the shape of the fruit.

STIPA COLUMBIANA var. **NELSÓNI** (Scribn.) Hitchc. Differing in its usually larger size, often as much as 1 m. tall, the broader culm blades, and the larger and denser panicle; lemma 6 to 7 mm. long; awn as much as 3.5 cm. long, sometimes longer. ♀ —Alberta to Washington, south to Colorado and Arizona.



FIGURE 665.—*Stipa columbiána*. Panicle, $\times \frac{1}{2}$; lemma, $\times 5$. (Nelson 7478, Wyo.)

29. *Stipa lettermáni* Vasey. LETTER-MAN NEEDLEGRASS. (Fig. 666.) Resembling small forms of *S. columbiána*; culms often in large tufts, 30 to 60 cm. tall; blades slender, involute; panicle slender, narrow, loose, 10 to 15 cm. long; glumes about 6 mm. long; lemma 4 to 5 mm. long, slender and more copiously hairy than in *S. columbiána*; awn 1.5 to 2 cm. long. ♀ —Open ground or open woods at upper altitudes, Wyoming to Montana and Oregon, south to New Mexico and California.

30. *Stipa williamsii* Scribn. WILLIAMS NEEDLEGRASS. (Fig. 667.) Differing from *S. columbiána* chiefly in having more or less pubescent culms, sheaths, and blades; culms

60 to 100 cm. tall; panicle 10 to 20 cm. long; lemma about 7 mm. long; awn usually 3 to 5 cm. long. 2 — Dry hills and plains, Montana to Washington, south to Colorado and California.

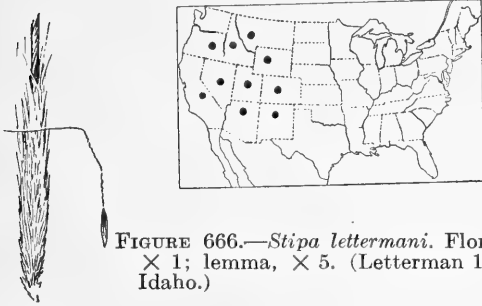


FIGURE 666.—*Stipa lettermani*. Floret, $\times 1$; lemma, $\times 5$. (Letterman 102, Idaho.)

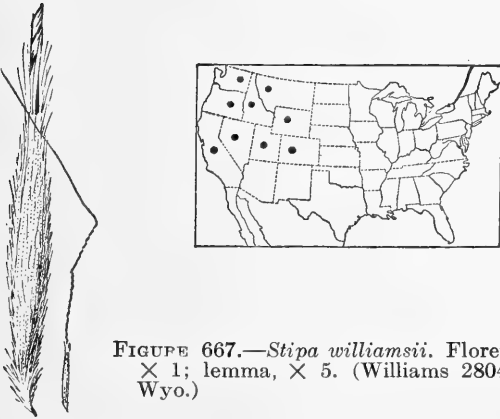


FIGURE 667.—*Stipa williamsii*. Floret, $\times 1$; lemma, $\times 5$. (Williams 2804, Wyo.)

31. *Stipa diegoensis* Swallen. (Fig. 668.) Culms 70 to 100 cm. tall, scaberrulous, densely pubescent below the nodes; sheaths glabrous or scaberrulous; ligule 1 to 2 mm. long, obtuse or truncate; blades 15 to 40 cm. long, 2 to 4 mm. wide, flat or involute, scabrous below, pubescent above; panicle 15 to 30 cm. long, dense, the branches appressed; glumes acuminate, the first 9 to 10 mm. long, 1-nerved, the second 8 to 9 mm. long, 3-nerved; lemma 6.5 to 7.5 mm. long, the hairs at the summit 1 to 2 mm. long, the callus 0.5 mm. long, sharp-pointed; awn 2 to 3.3 cm. long, twice-geniculate, scabrous. 2 — Along streams in chaparral. Known only from San Diego County (Jamul), Calif., and northern Baja California.

32. *Stipa pinetorum* Jones. (Fig. 669.) Culms in large tufts, 30 to 50



FIGURE 668.—*Stipa diegoensis*. Floret, $\times 1$; lemma $\times 5$. (Type.)

cm. tall; ligule very short; leaves mostly basal, the blades 5 to 12 cm. long, involute-filiform, more or less flexuous, slightly scabrous; panicle narrow, 8 to 10 cm. long; glumes about 9 mm. long; lemma 5 mm. long, narrowly fusiform, clothed especially on the upper half with hairs 2 mm. long, forming a conspicuous tuft exceeding the body of the lemma, and bearing 2 hyaline teeth 1 mm. long at the summit; awn about 2 cm. long, twice-geniculate, nearly glabrous. 2 — Open pine woods at high altitudes, rare, Colorado to Montana, Idaho, and California.



FIGURE 669.—*Stipa pinetorum*. Floret, $\times 1$; lemma, $\times 5$. (Jones 6023, Colo.)

33. *Stipa árida* Jones. (Fig. 670.) Culms 40 to 80 cm. tall; blades 10 to 20 cm. long, 1 to 2 mm. wide, flat or involute, scabrous; panicle 10 to 15 cm. long, narrow, compact, pale or silvery; glumes 8 to 12 mm. long; lemma 4 to 5 mm. long; appressed-pubescent on the lower half and along the margin, slightly roughened toward the summit; awn 4 to 6 cm. long,

capillary, scaberulous, loosely twisted for 1 or 2 cm., flexuous beyond. 2 —Rocky slopes, Texas, Colorado to Arizona and California (Funeral Mountains).



FIGURE 670.—*Stipa arida*. Floret, $\times 1$; lemma, $\times 5$. (Jones 5377, Utah.)

34. *Stipa tenuissima* Trin. (Fig. 671.) Culms in large tufts, slender, wiry, 30 to 70 cm. tall; ligule 2 mm. long; blades 15 to 30 cm. long, sometimes longer, filiform, wiry, closely involute; panicle 10 to 30 cm. long, narrow, soft, nodding; glumes about 1 cm. long; lemma 2 to 3 mm. long, oblong-elliptic, glabrous, minutely papillose-roughened, the short callus densely pilose; awn about 5 cm. long, capillary, flexuous, obscurely geniculate about the middle. 2 —Dry open ground, rocky slopes, and open dry woods, Texas and New Mexico to central Mexico; Argentina.

***Stipa neesiána* Trin. and Rupr.** Related to *S. leucotricha* but with shorter lemma with thickened erose crown. 2 —Ballast, Mobile, Ala.; South America.

***Stipa brachychaéta* Godr.** Blades firm, flat, or loosely involute; panicle narrow, open, the few spikelets on slender pedicels; glumes 8 mm. long; lemma 5 mm. long, brown, pubescent in lines; awn 12 mm. long. 2 —Ballast near Portland, Oreg.; Argentina.

***STIPA ELEGANTÍSSIMA* Labill.** Tufted perennial; foliage scant; panicle commonly half the height of the plant, the filiform spreading branches conspicuously feathery; spikelets purple, long-awned. 2 —Sometimes cultivated for ornament; Australia.

***STIPA PENNÁTA* L.** Tufted perennial; blades elongate, involute; panicle few-flowered, the large spikelets with awns 25 to 35 cm. long, conspicuously feathery above the bend. 2 —Sometimes cultivated for ornament; Europe.

***STIPA TENACÍSSIMA* L. ESPARTO.** Tufted perennial with tough branching base; blades elongate, involute, tomentose at base and with erect auricles 3 to 10 mm. long; panicle narrow, dense; awns 4 to 6 cm. long, feathery below the bend. 2 —Sometimes cultivated for ornament; Spain and Algeria, where it is gathered for making paper and cordage; also in Portugal and Morocco.

***STIPA SPLÉNDENS* Trin.** Robust perennial, 1.2 to 2 m. tall; foliage scabrous; panicle 30 to 50 cm. long, many-flowered, but loose; spikelets 5 to 6 mm. long; lemma as long as the glumes, silky; awn weakly geniculate, 10 to 15 mm. long. 2 —Introduced from Siberia under the name "chee grass," sparingly cultivated. Seed of *Calamagrostis epigeios* was mixed with the first introduction and "chee grass" was erroneously applied to that, which thrived more vigorously than the *Stipa*.

92. ARÍSTIDA L. THREE-AWN

Spikelets 1-flowered, the rachilla disarticulating obliquely above the glumes; glumes equal or unequal, narrow, acute, acuminate, or awn-tipped; lemma indurate, narrow, terete, convolute, with a hard, sharp-pointed, usually minutely bearded callus, terminating above in a usually trifid awn (the lateral divisions reduced or obsolete in Section Streptachne), the base sometimes undivided, forming a column. Annual or perennial, mostly slender tufted grasses, with narrow, frequently convolute blades and narrow or sometimes open panicles. Type species, *Aristida adscensionis* L. Name from Latin *arista*, awn.

The species are of distinctly minor importance for forage except in the Southwest, where several, such as *A. longisetia*, are eaten by stock before the



FIGURE 671.—*Stipa tenuissima*. Plant, $\times \frac{1}{2}$; spikelet, $\times 2$; glumes and floret, $\times 5$. (Bailey 694, Tex.)

flowers are produced. The ripe fruits of several species are troublesome to stock on the plains because of the sharp hard points. These fruits are produced sometimes in vast numbers and are carried far and wide by the wind in open country. *Aristida adscensionis* is one of the annuals that make up the "six-weeks" grasses of the Southwest.

Lemma articulate with the column of the awns; awns nearly equal.

SECTION 1. ARTHRATHERUM.

Lemma not articulate.

Lateral awns minute (less than 1 mm. long) or wanting..... SECTION 2. STREPTACHNE.

Lateral awns more than 1 mm. long (rarely obsolete in *A. ramosissima*), usually well developed..... SECTION 3. CHAETARIA.

Section 1. *Arthratherum*

Plants annual.

Column very short..... 1. *A. DESMANTHA*.

Column 10 to 15 mm. long, twisted..... 2. *A. TUBERCULOSA*.

Plants perennial.

Culms pubescent..... 3. *A. CALIFORNICA*.

Culms glabrous..... 4. *A. GLABRATA*.

Section 2. *Streptachne*

Awn (column) twisted at base..... 7. *A. ORCUTTIANA*.

Awn not twisted.

Branches of panicle distant, spreading, mostly more than 5 cm. long, naked at base; awn straight or abruptly divergent..... 5. *A. TERNIPES*.

Branches of panicle short, approximate, 3 to 5 cm. long, floriferous nearly to base; awn curved and flexuous..... 6. *A. FLORIDANA*.

Section 3. *Chaetaria*

1a. Central awn spirally coiled at base, the lateral straight. Plants annual. (Group DICHOTOMAE.)

Lateral awns half to two-thirds as long as the central, somewhat spreading.

8. *A. BASIRAMEA*.

Lateral awns much shorter than the central, 1 to 3 mm. long, erect.

Glumes nearly equal, 6 to 8 mm. long; lemma sparsely appressed-pilose, 5 to 6 mm. long..... 9. *A. DICHOTOMA*.

Glumes unequal, the second longer, about 1 cm. long; lemma glabrous except the keel, scabrous toward the apex, about 1 cm. long..... 10. *A. CURTISSII*.

1b. Central awn not spirally coiled (in a few species all the awns loosely contorted in the lower part).

2a. Plants annual. (Group ADSCENSIONES.)

Awns mostly 4 to 7 cm. long, about equal, divergent..... 11. *A. OLIGANTHA*.

Awns mostly less than 2 cm. long, often unequal.

Central awn with a semicircular bend at base, spreading or reflexed.

Lateral awns much reduced; lemma about 2 cm. long..... 12. *A. RAMOSISSIMA*.

Lateral awns one-third to half as long as the central; lemma 4 to 5 mm. long.

13. *A. LONGESPIDA*.

Central awn not sharply curved, the awns about equally divergent.

Glumes unequal; awns flat at base, 10 to 15 mm. long..... 14. *A. ADSCENSIONIS*.

Glumes about equal; awns terete, 15 to 20 mm. long..... 15. *A. INTERMEDIA*.

2b. Plants perennial.

3a: Panicle open, the branches spreading (in *A. pansa* ascending), naked at base. (Group DIVARICATAE.)

Panicle branches stiffly and abruptly spreading or reflexed at base.

Branchlets divaricate and implicate..... 16. *A. BARBATA*.

Branchlets appressed.

Summit of lemma narrowed into a twisted neck 2 to 5 mm. long.

17. *A. DIVARICATA*.

Summit of lemma somewhat narrowed but not twisted..... 18. *A. HAMULOSA*.

Panicle branches drooping or ascending, not abruptly spreading at base.

Lateral awns one-fourth to half as long as the central one..... 19. *A. PATULA*.

Lateral awns about as long as the central, at least more than half as long.

20. *A. PANSA*.

3b. Panicle narrow, the branches ascending or appressed (branches sometimes somewhat spreading in *A. parishii* and *A. purpurea*).

Column 1 cm. or more long, twisted; glumes awned..... 21. *A. SPICIFORMIS*.

Column less than 1 cm. long.

- Creeping rhizomes present. Glumes unequal, awned; awns loosely twisted at base, the central a little longer, 18 to 24 mm. long..... 31. *A. RHIZOMOPHORA*.
- Creeping rhizomes wanting (sometimes short ones in *A. stricta*).
- 4a. First glume about half as long as the second (as much as two-thirds as long in *A. glauca*). (Group PURPUREAE.)
- Lemma tapering into a slender somewhat twisted beak 5 to 6 mm. long; awns 1.5 to 2.5 cm. long, widely spreading..... 22. *A. GLAUCA*.
- Lemma beakless or only short-beaked.
- Branches of the rather loose and nodding panicle slender and flexuous (see also *A. longisetia* var. *rariflora*).
- Lemma about 1 cm. long; awns 3 to 5 cm. long..... 23. *A. PURPUREA*.
- Lemma 7 to 8 mm. long; awns about 2 cm. long.... 24. *A. ROEMERIANA*.
- Branches of the erect panicle stiff and appressed, or the lowermost sometimes somewhat flexuous.
- Panicle mostly more than 15 cm. long, the branches several-flowered; awns about 2 cm. long. Sheaths with a villous line across the collar. 25. *A. WRIGHTII*.
- Panicle mostly less than 15 cm. long, the branches few-flowered; awns 2 to several cm. long.
- Lemma gradually narrowed above, scaberulous on the upper half; leaves mostly in a short curly cluster at the base of the plant. 27. *A. FENDLERIANA*.
- Lemma scarcely narrowed above, scaberulous only at the tip; leaves not conspicuously basal..... 26. *A. LONGISETA*.
- 4b. First glume more than half as long as the second. (Usually the glumes about equal or the first sometimes a little longer.)
- Sheaths lanate-pubescent. Panicle branched, somewhat spreading; central awn 1.5 to 2.5 cm. long, spreading or reflexed from a curved base. 28. *A. LANOSA*.
- Sheaths not lanate-pubescent.
- Column of awn at maturity 3 to 5 mm. long, distinctly twisted. 29. *A. ARIZONICA*.
- Column of awn less than 3 mm. long, or if so long, not twisted.
- Blades villous on upper surface near base, involute..... 30. *A. STRICTA*.
- Blades not involute and villous at base.
- Awns at maturity about equally divergent, sometimes slightly twisted but not spirally contorted at base.
- Lemma about 7 mm. long; awns horizontally spreading; panicle usually more than 20 cm. long..... 32. *A. PURPURASCENS*.
- Lemma 10 to 12 mm. long; awns somewhat spreading but scarcely horizontal; panicle mostly 10 to 15 cm. long. 33. *A. PARISHII*.
- Awns at maturity unequally divergent or spirally contorted at base.
- Awns not spirally contorted at base; central awn more spreading than the others, curved at base, sometimes reflexed.
- Lateral awns erect, two-thirds to three-fourths as long as the central.
- Glumes about 12 mm. long..... 34. *A. AFFINIS*.
- Glumes about 6 mm. long..... 35. *A. VIRGATA*.
- Lateral awns spreading or reflexed. Panicles nearly simple.
- Glumes 6 to 7 mm. long; spikelets mostly in pairs. 36. *A. SIMPLICIFLORA*.
- Glumes about 1 cm. long; spikelets solitary.... 37. *A. MOHRII*.
- Awns spirally contorted at base, spreading.
- Blades flat (sometimes subinvolute in *A. condensata*).
- Panicle slender, the branches short, rather distant, few-flowered. 38. *A. TENUISPICA*.
- Panicle rather thick, the branches as much as 10 cm. long, rather densely many-flowered..... 39. *A. CONDENSATA*.
- Blades involute..... 40. *A. GYRANS*.

SECTION 1. *ARTHRAETHERUM* (Beauv.)
Reichenb.

Lemma articulate with the column of the awns, the latter finally decid-

uous; glumes 1-nerved; awns nearly equal.

1. *Aristida desmántha* Trin. and Rupr. (Fig. 672.) Annual; branching,



FIGURE 672.—*Aristida desmantha*, $\times 1$. (Reverchon 3428, Tex.)

as much as 80 cm. tall; sheaths often woolly; blades folded or involute, 2 to 3 mm. wide; panicle as much as 20 cm. long, the branches stiffly ascending, very scabrous, bearing 1 to few spikelets; glumes slightly unequal, the body about 1 cm. long, tapering into an awn about half as long; lemma 7 to 8 mm. long, glabrous below,

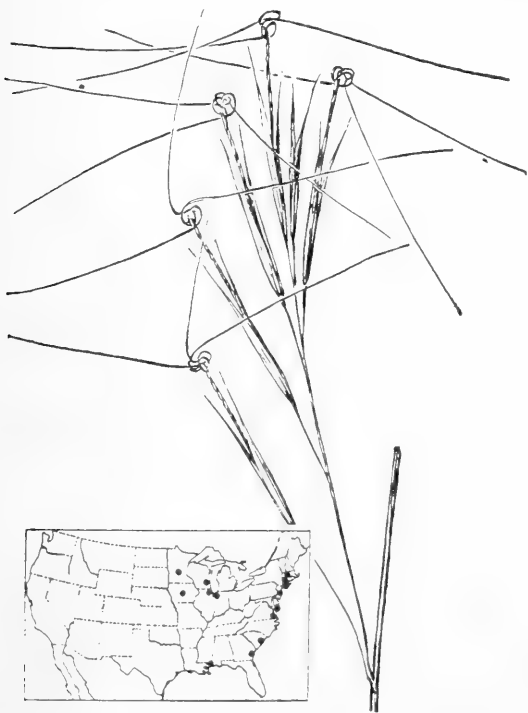


FIGURE 673.—*Aristida tuberculosa*, $\times 1$. (V. H. Chase 322, Ind.)

somewhat laterally compressed and slightly twisted at summit, the densely pubescent callus about 2 mm. long; awns 2 to 2.5 cm. long, united for 1 to 2 mm., the bases curved in a semicircular somewhat contorted bend, the upper part thus usually deflexed. ☉ —Open sandy soil or sandy woods, Illinois, Nebraska, and Texas.

2. *Aristida tuberculosa* Nutt. (Fig. 673.) Annual; culms branching, 30 to 60 cm. or even 1 m. tall; blades involute, 2 to 4 mm. wide when flat; panicle 10 to 20 cm. tall, the branches stiffly ascending; glumes about equal, gradually narrowed into an awn, about 2.5 cm. long, including the awn; lemma 11 to 13 mm. long, glabrous, except for the slightly scabrous summit, extending downward into a densely pubescent callus 3 to 4 mm. long; column of awns twisted, 10 to 15 mm. long, the upper 2 or 3 mm. twisted but not united, above this forming a semicircular bend, the terminal straight part of the awns usually deflexed, 3 to 4 cm. long. ☉ —Open sandy woods, Massachusetts to Georgia and Mississippi near the coast; around the southern end of Lake Michigan and in other localities in Wisconsin, Indiana, Illinois, Iowa, and Minnesota.

3. *Aristida californica* Thurb. (Fig. 674.) Perennial, tufted, much branched at base; culms pubescent, 10 to 30 cm. tall; blades mostly involute and less than 5 cm. long; panicles numerous, mostly reduced to few-flowered racemes; first glume about 8 mm. long, the second about 12 mm. long; lemma 5 to 7 mm. long, glabrous below, scaberulous toward the summit, the strongly pubescent callus 1.5 to 2 mm. long; column 15 to 20 mm. long, the awns about equal, 2.5 to 3.5 cm. long, spreading horizontally, the bases arcuate and slightly contorted. ☿ —Dry sandy or gravelly soil, deserts of southern California, southwestern Arizona, and northern Mexico.

4. *Aristida glabrata* (Vasey)

Hitchc. (Fig. 675.) Perennial; culms erect, branched, glabrous, 20 to 40 cm. tall; blades mostly involute, those of the culm 1 to 3 cm. long; panicle narrow, 3 to 6 cm. long; first glume 5 to 6 mm., the second 10 to 12 mm. long; lemma 5 to 7 mm. long, the twisted column 6 to 14 mm. long; awns about equal, divergent, 2 to 3 cm. long. 2 —Open dry ground, southern Arizona to Baja California.

SECTION 2. STREPTÁCHNE (R. Br.) Domin
(Sect. *Unisetia* Hitchc.)

Lateral awns minute (less than 1 mm. long) or wanting (see also *A. dichotoma* and *A. ramosissima* of Section *Chaetaria*); lemma not articulate with the column of the awn.

5. *Aristida térnipes* Cav. SPIDER GRASS. (Fig. 676.) Perennial; culms



FIGURE 675.—*Aristida glabrata*, $\times 1$. (Griffiths 7312, Ariz.)



FIGURE 674.—*Aristida californica*, $\times 1$. (Kearney 3524, Ariz.)

erect, 50 to 100 cm. tall; blades flat, involute toward the end and tapering into a fine point, as much as 40 cm. long, 2 to 3 mm. wide; panicle open, one-third to half the entire height of the plant, the branches few, distant, spreading, scabrous, mostly naked at base; spikelets appressed at the ends of the branches; glumes about equal, 8 to 10 mm. long; lemma glabrous, often strongly scabrous on the keel, gradually narrowed into a laterally compressed scabrous falcate beak, 1-nerved on each side, this extending into a single straight or divergent scabrous nearly terete awn, the obsolete



FIGURE 676.—*Aristida ternipes*, $\times 1$. (Griffiths 7271, Ariz.)

or minute lateral awns about 1.7 mm. above the lemma, the central awn 10 to 15 mm. long. $\text{\textcircled{2}}$ (*A. scabra* Kunth.)—Rocky hills and dry plateaus, Texas, New Mexico, and Arizona to northern South America; Bahamas, Cuba. *ARISTIDA TERNIPES* var. *MÍNOR* (Vasey) Hitchc. Smaller and often prostrate or ascending, the panicle usually more than half the length of the entire plant, less diffuse, the shorter branches usually stiffly spreading or somewhat deflexed. $\text{\textcircled{2}}$ (*A. divergens* Vasey.)—Rocky hills and plains, Texas to Arizona; Nicaragua.



FIGURE 677.—*Aristida floridana*, $\times 1$. (Blodgett, Fla.)

6. *Aristida floridana* (Chapm.) Vasey. (Fig. 677.) Resembling *A. ternipes*, but differing in having a narrow panicle with ascending branches 3 to 5 cm. long, spikelet-bearing nearly to the base; awns sickle-shaped, the column somewhat twisted. $\text{\textcircled{2}}$ —Known only from the original collection from Key West, Fla.

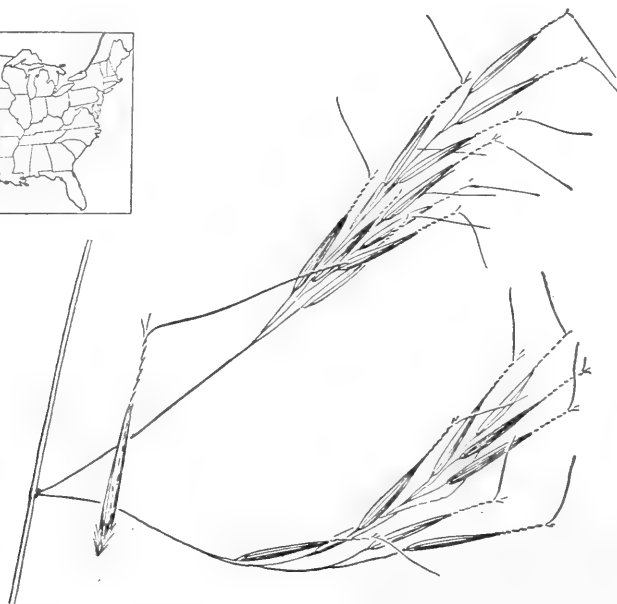


FIGURE 678.—*Aristida orcuttiana*. Panicle, $\times 1$; floret, $\times 2$. (Smith, N. Mex.)

7. *Aristida orcuttiána* Vasey. BEGGARTICK GRASS. (Fig. 678.) Perennial; culms erect, 30 to 60 cm. or even 1 m. tall; blades flat or the upper involute, as much as 3 mm. wide; panicle open, as much as 30 cm. long, nodding or drooping, the branches few, distant, spreading or drooping, as much as 20 cm. long; glumes equal or nearly so, 10 to 15 mm. long; lemma 8 to 10 mm. long, gradually narrowed into a scabrous twisted column, the total length to the bend 10 to 17 mm.; central awn divergent, 5 to 10 mm. long, the lateral awns from obsolete to as much as 1 to 2 mm. long, erect. ☉ —Rocky hills and plains, Texas to southern California (San Diego), and northwestern Mexico.

SECTION 3. CHAETÁRIA (Beauv.) Trin.

Lateral awns more than 1 mm. long, usually well developed; lemma not articulate with the column of the awns.



FIGURE 679.—*Aristida basiramea*, × 1. (Pammel 174, Iowa.)

8. *Aristida basiramea* Engelm. ex Vasey. (Fig. 679.) Annual; branching at base, 30 to 50 cm. tall; blades flat, as much as 15 cm. long and 1.5 mm. wide; panicles terminal and axillary, the terminal 5 to 10 cm. long, the



FIGURE 680.—*Aristida dichotoma*, × 1. (Jackson 1829, Del.)

axillary mostly enclosed in the sheaths; glumes somewhat unequal, 12 to 15 mm. long; lemma about 1 cm. long; central awn coiled at base, 10 to 15 mm. long, the lateral awns half to two-thirds as long, somewhat spreading. ☉ —Open barren or sandy soil, Maine to North Dakota, south to Kentucky, Oklahoma, and Colorado; introduced in Maine.

9. *Aristida dichotoma* Michx. (Fig. 680.) Annual; culms branched at base, 20 to 40 cm. tall; blades short, the lower mostly flat, scarcely 1 mm. wide, the upper involute; panicles terminal and axillary, the terminal usually less than 10 cm. long, the lateral small; glumes about equal, 6 to 8 mm. long; lemma 5 to 6 mm. long; central awn spirally coiled, horizontally bent, 3 to 6 mm. long, the lateral awns erect, about 1 mm. long. ☉ —Dry open ground, Maine to Wisconsin and eastern Kansas, south to Florida and Texas.

10. *Aristida curtissii* (A. Gray) Nash. (Fig. 681.) Annual; similar to *A. dichotoma*, differing in the less branching habit, the longer and more



FIGURE 681.—*Aristida curtissii*, $\times 1$. (Waite, Ill.)

conspicuous blades, the looser panicles of larger spikelets, the more unequal glumes, the longer second glume (about 1 cm. long), the longer smooth lemma (about 1 cm. long) and central awn, and the usually longer lateral awns; central awn about 1 cm. long, the lateral awns 2 to 4 mm. long. ☉ —Open dry ground, Maryland and Virginia to South Dakota, Wyoming, Colorado, and Kentucky to Oklahoma; Florida.

11. *Aristida oligantha* Michx. PRAIRIE THREE-AWN. (Fig. 682.) Annual, much branched; culms 30 to 50 cm. tall; blades flat or loosely involute, usually not more than 1 mm. wide; panicle loose, 10 to 20 cm. long; spikelets short-pedicelled, the lower often in pairs; glumes about equal, 2

to 3 cm. long, tapering into an awn, the first 3- to 5-nerved; lemma about 2 cm. long, the awns about equal, divergent, 4 to 7 cm. long, somewhat spirally curved at base. ☉ —Open dry ground, Massachusetts to South Dakota, south to Florida and Texas; Oregon to Arizona.

12. *Aristida ramosissima* Engelm. ex A. Gray. (Fig. 683.) Annual, much branched; culms 30 to 50 cm. tall; blades flat or involute, about 1 mm. wide; panicle narrow, 8 to 12 cm. long; glumes 3- to 5-nerved, the first about 15 mm., the second about 2 cm. long, including an awn 3 to 5 mm. long; lemma about 2 cm. long, tapering into a neck about 5 mm. long; central awn with a semicircular bend or part of a coil at base, 15 to 20 mm. long, spreading, the lateral awns reduced or as much as 6 mm. long, rarely longer. ☉ —Open sterile soil, Indiana to Iowa, south to Tennessee, Louisiana, Oklahoma, and Texas.

13. *Aristida longespica* Poir. (Fig. 684.) Annual, branched; culms 20 to 40 cm. tall; blades flat or involute, about 1 mm. wide; panicles narrow, slender, the terminal 10 to 15 cm. or even 20 cm. long; glumes about equal, 5 mm. long; lemma 4 to 5 mm. long; central awn sharply curved at base, spreading, 5 to 15 mm. long, the lateral awns erect, one-third to half as long as the central, sometimes only 1 mm. long. ☉ (*A. gracilis* Ell.)—Sterile or sandy soil, New Hampshire to Michigan and Kansas, south to Florida and Texas, especially on the Coastal Plain. In the typical form the lateral awns are short; in var. *geniculata* Fernald (*A. geniculata* Raf.) the lateral awns are more than one-third as long as the central one.

14. *Aristida adscensionis* L. SIX-WEEKS THREE-AWN. (Fig. 685.) Annual, branched at base, erect or spreading; culms 10 to 80 cm. tall; panicle narrow and usually rather compact, 5 to 10 cm. long, or longer in large plants; first glume 5 to 7



FIGURE 682.—*Aristida oligantha*. Plant, $\times \frac{1}{2}$; glumes and floret, $\times 2$. (Fitzpatrick 21, Iowa.)



FIGURE 683.—*Aristida ramosissima*, $\times 1$. (Deam 18549, Ind.)

mm. long, the second 8 to 10 mm. long; lemma 6 to 9 mm. long, compressed toward the scarcely beaked summit, scabrous on the upper part of the keel; awns about equal (the lateral occasionally shorter), mostly 10 to 15 mm. long, about equally divergent at an angle of as much as 45° , flat and without torsion at base. ☉ —Dry open ground, Missouri (Courtney); southern Kansas to Texas, west to Nevada and southern California, southward to Argentina; a common weed in the American tropics; warmer parts of the Old World. Originally described from Ascension Island. Variable in size from depauperate plants a few centimeters tall with shorter contracted panicle (*A. bromoides* H. B. K.) to tall slender plants with large open panicle (*A. fasciculata* Torr.).

15. *Aristida intermédia* Scribn. and Ball. (Fig. 686.) Annual, simple or branched, 20 to 40 cm. tall; blades flat or involute, mostly less than 10

cm. long and 2 mm. wide; panicle narrow, slender, loosely flowered, 10 to 20 cm. long; glumes about equal, 1 cm. long; lemma 8 mm. long; awns about equal, all somewhat divergent, 1.5 to 2 cm. long. ☉ —Low sandy soil, Indiana and Michigan to Nebraska, south to Florida (Pensacola), Mississippi, and Texas. The measurements of the spikelet are sometimes less than those given, especially in plants attacked by smut.

16. *Aristida barbata* Fourn. HAVARD THREE-AWN. (Fig. 687.) Perennial, forming hemispherical tufts as much as 30 cm. in diameter, the culms rather stiffly radiating in all directions, 15 to 30 cm. long; blades closely involute, mostly less than 10 cm. long and 0.5 mm. thick; panicles about half the length of the entire plant, open, the branches divaricately spreading or somewhat reflexed, mostly 3 to 6 cm. long, in pairs or with short basal branchlets, but without long naked base, the branchlets and pedicels implicate or flexuous, the whole panicle fragile at maturity, breaking away and rolling before the wind; glumes about equal, 1 cm. long; lemma gradually narrowed into a straight or twisted scaberulous beak, the entire length 8 to 10 mm.; awns somewhat di-



FIGURE 684.—*Aristida longespica*, $\times 1$. (Vasey, D. C.)

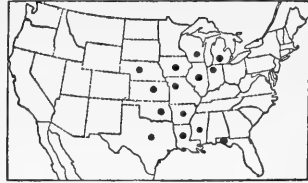
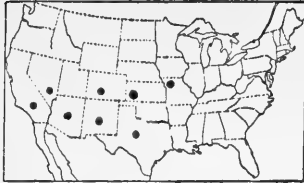


FIGURE 685.—*Aristida adscensionis*, $\times 1$. (Earle 559, N. Mex.)

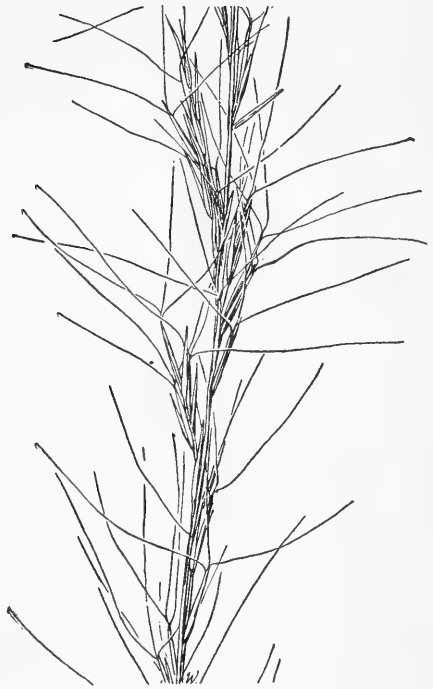


FIGURE 686.—*Aristida intermedia*, $\times 1$. (Kearney 236, Miss.)

vergent, nearly equal, 15 to 20 mm. long. 2 (A. *havardii* Vasey.)—Hills and plains, western Texas to Arizona and central Mexico.

17. *Aristida divaricatâ* Humb. and Bonpl. ex Willd. POVERTY THREE-AWN. (Fig. 688.) Perennial; culms erect or prostrate-spreading, usually 30 to 60 cm. long, sometimes longer; blades flat or usually loosely involute, or the basal closely involute, mostly less than 3 mm. wide; panicle large, diffuse, usually as much as half the entire length of the culm, the branches spreading or reflexed, naked below; glumes nearly equal, 1 cm. long; lemma 1 cm. long, narrowed into a twisted beak 2 to 5 mm. long; awns about equal, 10 to 15 mm. long. 2—Dry hills and plains, Kansas to southern California, south to Texas and Guatemala.

18. *Aristida hamulôsa* Henr. (Fig. 689.) Resembling *A. divaricata*; lem-

ma somewhat narrowed at summit but not twisted, central awn a little longer than the two lateral ones. 2—Dry hills and plains, western Texas to southern California, south



FIGURE 687.—*Aristida barbata*, $\times 1$. (Wooton, N. Mex.)



FIGURE 688.—*Aristida divaricata*, $\times 1$. (Talbot, N. Mex.)

to Guatemala. In Arizona more common than *A. divaricata*.

19. *Aristida pátula* Chapm. ex Nash. (Fig. 690.) Perennial, erect, as much as 1 m. tall; blades flat, becoming involute especially at the slender tip, elongate, 2 to 4 mm. wide; panicle loose and open, one-

third to half the entire length of the culm, the branches drooping, naked below, as much as 20 cm. long; glumes 12 to 15 mm. long, nearly equal; lemma 10 to 12 mm. long; central awn straight, 2 to 2.5 cm. long, the lateral scarcely diverging, 5 to 10 mm. long. 21 —Moist sandy pine barrens and low open ground, peninsular Florida.

20. *Aristida pánsa* Woot. and Standl. WOOTON THREE-AWN. (Fig. 691.) Perennial; culms stiffly erect, slender, wiry, 20 to 40 cm. tall; blades closely involute, 0.5 mm. thick, often flexuous; panicle rather nar-



FIGURE 690.—*Aristida patula*, $\times 1$. (Hitchcock, Fla.)



FIGURE 689.—*Aristida hamulosa*. Panicle, $\times 1$; floret, $\times 3$. (Type.)

row, open, rather stiffly upright, 10 to 20 cm. long, the branches stiffly ascending, 4 to 8 cm. long; spikelets erect or narrowly ascending on the branchlets; first glume 5 to 7 mm. long, the second 7 to 10 mm. long; lemma about as long as the second glume, or slightly longer, tapering into a scabrous slightly twisted beak about 2 mm. long; awns about equal,

abruptly long-awned, the first 4 mm. long, the second 8 to 10 mm. long, the awns usually 10 to 12 mm. long; lemma 5 to 6 mm. long, extending into a slender twisted column 1 to 3 cm. long; awns about equal, 2 to 3 cm. long, divergent or horizontally spreading, more or less curved or warped at base. 21 —Pine barrens along the coast, South Carolina to



FIGURE 691.—*Aristida pansa*, $\times 1$. (Wooton, N. Mex.)

divergent or finally nearly horizontally spreading, 10 to 20 mm. long, the bases finally somewhat curved or warped. 21 —Plains and open ground, western Texas to Arizona; northern Mexico.

21. *Aristida spiciformis* Ell. (Fig. 692.) Perennial; culms strictly erect, 50 to 100 cm. tall; blades erect, flat or usually involute, elongate, 1 to 3 mm. wide; panicle erect, dense and spikelike, 10 to 15 cm. long, more or less spirally twisted; glumes unequal,

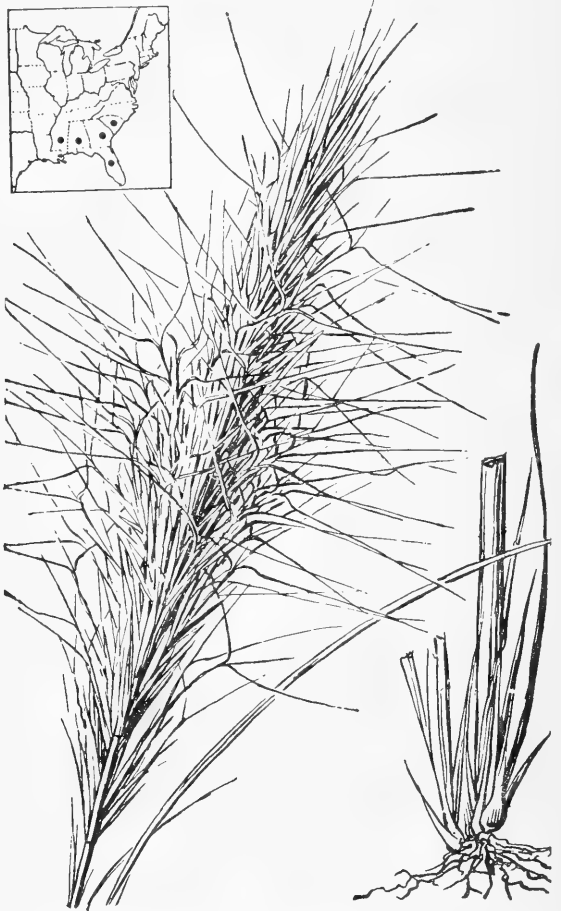


FIGURE 692.—*Aristida spiciformis*, $\times 1$. (Combs and Baker 1115, Fla.)

Florida and Mississippi; Cuba, Puerto Rico.

22. *Aristida glauca* (Nees) Walp. REVERCHON THREE-AWN. (Fig. 693.) Perennial; culms erect, 20 to 40 cm. tall; blades involute, mostly curved or flexuous, 5 to 10 cm. long, about 1 mm. thick; panicle narrow, erect, rather few-flowered, mostly 8 to 15 cm. long, the branches stiffly appressed; first glume 5 to 8 mm. long, the second about twice as long; lemma 10 to 12 mm. long, tapering into

a minutely scabrous, slender, somewhat twisted beak about half the total length of the lemma; awns equal, divergent or horizontally spreading, 1.5 to 2.5 cm. long. ♀ (*A. reverchoni* Vasey.)—Dry or rocky hills and plains, Texas to Utah, Nevada, and southern California, south to Puebla, Mexico.

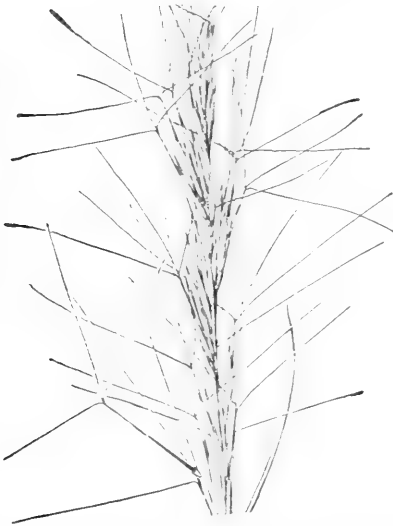
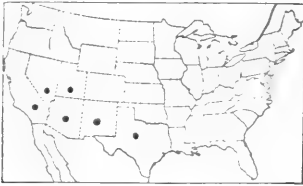


FIGURE 693.—*Aristida glauca*, $\times 1$. (Reverchon 1237, Tex.)

23. *Aristida purpurea* Nutt. PURPLE THREE-AWN. (Fig. 694.) Perennial, often in large tufts; culms 30 to 50 cm. tall; blades usually involute and less than 10 cm. long, 1 to 1.5 mm. wide when unrolled; panicle narrow, nodding, rather lax and loose, usually purplish, 10 to 20 cm. long, the branches and longer pedicels capillary, more or less curved or flexuous; first glume 6 to 8 mm. long, the second about twice as long; lemma about 1 cm. long, the body tapering to a scarcely beaked summit, tuberculate-scabrous in lines from below the middle to the summit; awns nearly equal, spreading, 3 to 5 cm. long. ♀ —Dry hills and

plains, Arkansas and Kansas to Utah and Texas to southern California; northern Mexico. *ARISTIDA PURPUREA* var. *LAXIFLÓRA* Merr. Panicle few-flowered, the capillary branches bearing 1 or 2 spikelets. ♀ —Texas to Arizona.

24. *Aristida roemeriana* Scheele. (Fig. 695.) Differing from *A. purpurea* chiefly in the smaller spikelets; first glume 4 to 5 mm. long; lemma 7 to 8 mm. long, the awns about 2 cm. long. ♀ (*A. micrantha* Nash.) —Texas, New Mexico, and northern Mexico.

25. *Aristida wrightii* Nash. (Fig. 696.) Perennial; culms tufted, erect, 30 to 60 cm. tall; sheaths villous at the throat and with a more or less hispid or villous line across the collar; blades involute, curved or flexuous; panicle erect, narrow, 15 to 20 cm. long; first glume 6 to 7 mm. long, the second about twice as long; lemma 10 to 12 mm. long; awns nearly equal, about 2 cm. long, divergent. ♀ —Dry plains and hills, Oklahoma, Texas, Colorado, and Utah to southern California and central Mexico.

26. *Aristida longisetá* Steud. RED THREE-AWN. (Fig. 697.) Perennial, often in large bunches; culms 20 to 30 cm. tall; blades involute, curved or flexuous, usually less than 15 cm. long; panicle narrow, erect but not stiff, few-flowered, the axis only a few cm. long, the branches ascending or appressed, or the lower more or less curved or flexuous; first glume 8 to 10 mm. long, the second about twice as long; lemma terete, 12 to 15 mm. long, only slightly narrowed above, glabrous or the upper part scaberulous but scarcely tuberculate-scabrous in lines as in *A. purpurea*; awns about equal, divergent, 6 to 8 cm. long. ♀ —Plains and foothills, North Dakota and Iowa to Montana and British Columbia, south to Texas, Arizona, and northern Mexico. *ARISTIDA LONGISETA* var. *RARIFLÓRA* Hitchc. Differing in the few-flowered panicles with capillary flexuous branches bearing 1 or 2 spikelets.

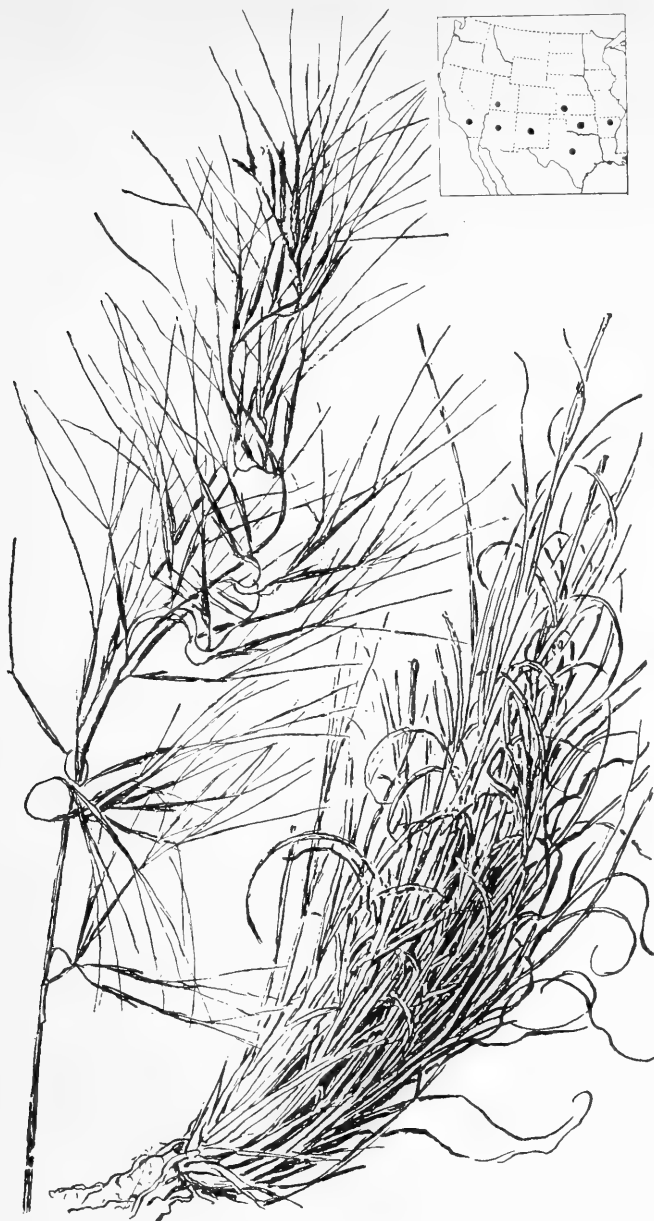


FIGURE 694.—*Aristida purpurea*, $\times 1$. (Bush 665, Tex.)



FIGURE 695.—*Aristida roemeriana*, $\times 1$. (Swallen 1585, Tex.)

FIGURE 696.—*Aristida wrightii*, $\times 1$. (Ball 1511, Tex.)

2 —Texas to Colorado and Arizona.

ARISTIDA LONGISETA var. **ROBÚSTA** Merr. Taller and more robust, 30 to 50 cm. tall, the blades longer and not in conspicuous basal tufts, the panicle longer, stiffer, and the branches more stiffly ascending, the awns mostly 4 to 5 cm. long. 2 —Same range but more common northward, extending east to Minnesota and west to Washington and California.

27. *Aristida fendleriána* Steud. **FENDLER THREE-AWN.** (Fig. 698.) Resembling *A. longiseta*; differing in the numerous short curly blades at the base of the plant, the shorter glumes (the first about 7 mm. long), the gradually narrowed lemma, scaberulous on the upper half, and the shorter awns (2 to 5 cm. long). 2 —Dry plains and hills, North Dakota and Montana, south to Texas, Nevada, and southern California; Mexico.

28. *Aristida lanósa* Muhl. ex Ell. (Fig. 699.) Perennial; culms solitary or few in a tuft, rather robust, 1 to 1.5 m. tall; sheaths lanate-pubescent or rarely glabrous; blades flat, elon-

FIGURE 697.—*Aristida longiseta*, $\times 1$. (Thompson 63, Kans.)

gate, as much as 4 mm. wide; panicle narrow, rather loose, as much as 40 cm. long; first glume 12 to 14 mm. long, the second about 10 mm.; lemma 8 to 9 mm. long; central awn horizontally spreading or reflexed from a curved base, 1.5 to 3 cm. long, the lateral half to two-thirds as long, erect or spreading. 2 — Dry sandy soil of the Coastal Plain, New Jersey and West Virginia to Florida and Texas; Tennessee; Oklahoma and Missouri. A slender form 65 cm. tall, with fewer-flowered panicle; the



FIGURE 699.—*Aristida lanosa*, $\times 1$. (Canby, Md.)

lemma 10 mm. long, the central awn 2.5 to 3 cm. long, has been differentiated as *A. lanosa* var. *macera* Fern. and Griseb. 2 — Cape Henry, Va.



FIGURE 698.—*Aristida fendleriana*, $\times 1$. (Coville 1089, Ariz.)

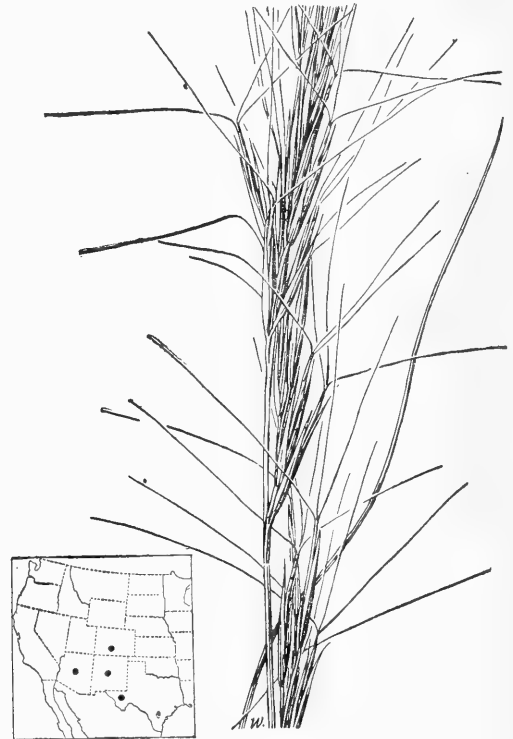


FIGURE 700.—*Aristida arizonica*, $\times 1$. (Rusby, Ariz.)

29. *Aristida arizonica* Vasey. ARIZONA THREE-AWN. (Fig. 700.) Perennial; culms erect, 30 to 120 cm. tall; blades flat, narrowed to a fine involute point or some of them involute throughout, 1 to 4 mm. wide, the old ones usually curled or flexuous; pan-

icle narrow, erect, closely flowered or more or less interrupted at base, 10 to 25 cm. long; glumes equal or nearly so, awn-pointed, 10 to 15 mm. long; lemma 1 to 1.5 cm. long, including the more or less twisted beak of about 3 to 5 mm.; awns about equal, ascending, 1 to 2 cm. long. ♀ —Dry plains, stony hillsides, and open forest, mostly at 1,500 to 2,500 m. altitude, southern Colorado and western Texas to Arizona.



FIGURE 701.—*Aristida stricta*, $\times 1$. (Chase 4565, N. C.)

30. *Aristida stricta* Michx. PINE-LAND THREE-AWN. (Fig. 701.) Perennial; culms erect, 50 to 100 cm. tall; blades closely involute, villous on the upper surface above the base (the hairs visible without unrolling the blade), elongate, 1 mm. thick; panicle slender, as much as 30 cm. long; glumes about equal, 7 to 10 mm. long; lemma 6 to 8 mm. long, scarcely beaked; awns divergent, the central 1 to 1.5 cm. long, the lateral a little

shorter. ♀ —Common in pine barrens, North Carolina to Florida, west to Mississippi.

31. *Aristida rhizomóphora* Swallen. (Fig. 702.) Perennial; culms tufted, erect, 65 to 80 cm. tall, producing well-developed scaly rhizomes; blades firm, flat or folded, 7 to 10 cm. long, 1 to 2 mm. wide, those of the innovations flexuous, as much as 30 cm. long; panicle flexuous, 20 to 30 cm. long, the distant branches somewhat spreading, few-flowered, spikelet-bearing from near the base; glumes acuminate, usually awned, the first 8 to 14 mm. long, the second 12 to 17 mm. long (including the awn); lemma 9 to 12 mm. long, the callus 1 mm. long, the awns flexuous, curved or loosely twisted at base, spreading, the central often reflexed by a semicircular bend, 18 to 28 mm. long, the lateral 15 to 20 mm. long. ♀ —Prairies, peninsular Florida.

32. *Aristida purpuráscens* Poir. ARROWFEATHER. (Fig. 703.) Perennial; culms tufted from a rather thin, weak, sometimes decumbent base, slender, 40 to 70 cm. or even 1 m. tall; blades flat, rather lax and flexuous (especially the old ones), usually less than 2 mm. wide; panicle narrow, rather lax and nodding, one-third to half the entire length of the plant; glumes about equal, mostly 8 to 12 mm. long; lemma about 7 mm. long; awns about equal, divergent or somewhat reflexed, 1.5 to 2.5 cm. long. ♀ —Dry sandy soil, Massachusetts to Wisconsin and Kansas, south to Florida and Texas; British Honduras.

33. *Aristida paríshii* Hitchc. (Fig. 704.) Perennial; culms erect, 30 to 50 cm. tall; blades more or less involute, sometimes flat, 1 to 2 mm. wide; panicle narrow, 15 to 30 cm. long; glumes short-awned, the first 12 mm. long, the second 1 or 2 mm. longer; lemma about 12 mm. long, tapering into a short, straight or obscurely twisted beak; awns about equal, divergent, about 2.5 cm. long. ♀ —



FIGURE 702.—*Aristida rhizomophora*. Plant, $\times \frac{1}{2}$; spikelet, $\times 2$; two views of callus, $\times 10$. (Type.)

Dry or rocky soil, Nevada, Arizona, and southern California.

34. *Aristida affinis* (Schant.) Kunth. (Fig. 705.) Perennial; culms tufted from a hard thickened base, stiffly erect, rather stout, 1 to 1.5 m. tall; blades flat, becoming loosely involute, elongate, as much as 3 mm. wide; panicle narrow, virgate, as much as 50 cm. long; glumes equal, about 12 mm. long, the first with a distinct nerve on one side (thus 2-nerved); lemma 8 mm. long, the straight beak about 1 mm. long; central awn horizontally spreading, 1.5 to 3 cm. long, the lateral awns erect, two-thirds to three-fourths as long. ♀ (*A. palustris* Vasey).—Low pine barrens and flatwoods, North Carolina and Kentucky to Florida and Texas, mostly on the Coastal Plain.

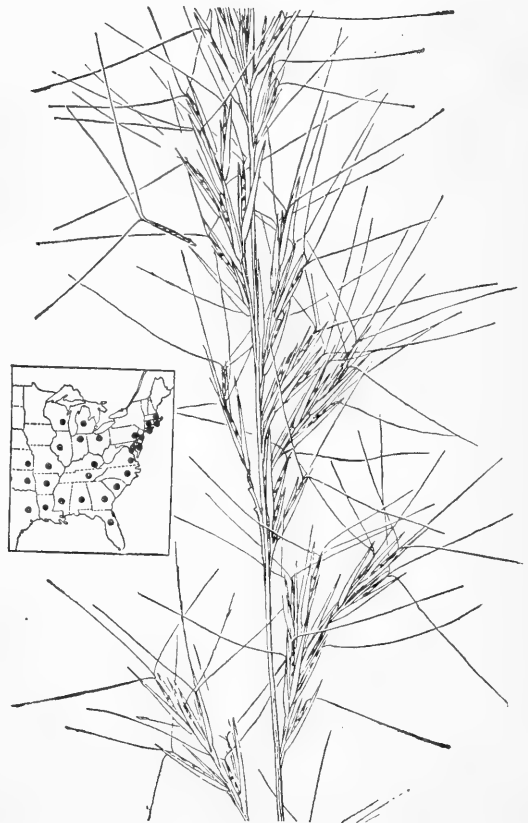


FIGURE 703.—*Aristida purpurascens*, $\times 1$. (Chase 4563, N. C.)



FIGURE 704.—*Aristida parishii*, $\times 1$. (Parish 1029A, Calif.)

35. *Aristida virgata* Trin. (Fig. 706.) Perennial; culms tufted from a rather slender soft base, erect, 50 to 80 cm. tall; blades flat, rather lax, usually not more than 2 mm. wide; panicle slender, erect, though not very stiff, rather loosely flowered, one-third to half the entire length of the culm; glumes about equal, 6 to 7 mm. long; lemma 4 to 5 mm. long; central awn horizontally spreading or somewhat reflexed, 1.5 to 2 cm. long, the lateral awns erect, about two-thirds as long as the central. ♀ (*A. chapmaniana* Nash.)—Moist sandy soil of the Coastal Plain, New Jersey to Florida and Texas.

36. *Aristida simpliciflora* Chapm. (Fig. 707.) Perennial; culms erect from a rather delicate base, slender, 30 to 60 cm. tall; blades flat, 5 to 15

cm. long, 1 mm. wide; panicle slender, somewhat nodding, 10 to 20 cm. long, few-flowered, the spikelets mostly in pairs; glumes equal, 6 to 7 mm. long; lemma a little shorter than the glumes; central awn finally reflexed by a semicircular bend, 1 to 1.5 cm. long, the lateral awns horizontally spreading, a little shorter than the central one. ♀ —Moist pine woods, rare, western Florida; Mississippi (McNeill).

37. *Aristida mōhrri* Nash. (Fig. 708.) Perennial; culms erect, 40 to 60 cm. tall; blades flat or those of the innovations involute, 10 to 15 cm. long, 1 to 2 mm. wide, the uppermost reduced; panicle slender, strict, as much as 30 cm. long; spikelets solitary, appressed, distant, even the upper not overlapping; glumes equal, firm, rather broad toward the mucronate apex, 1 cm. long; lemma terete, a little shorter than the glumes; awns divergent, the central one reflexed by a semicircular bend near the base, 1.5 to 2 cm. long, the lateral ones scarcely shorter than the central, horizontally spreading or re-

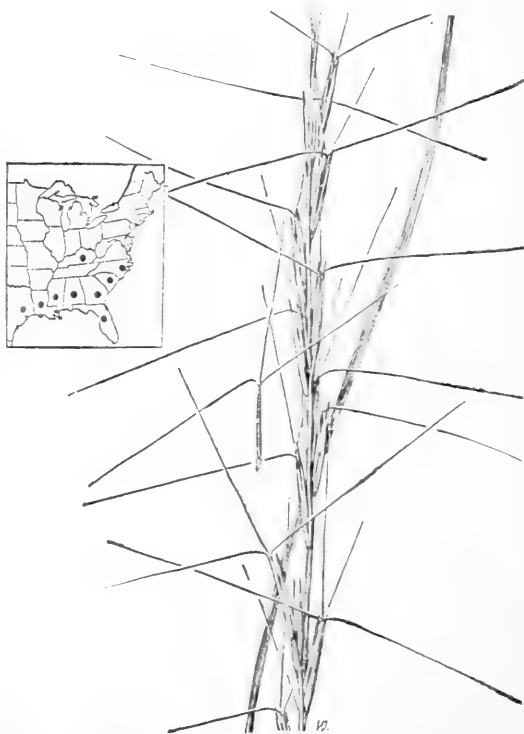


FIGURE 705.—*Aristida affinis*, $\times 1$. (Combs 688, Fla.)

flexed. 2 —Sterile soil, South Carolina, Florida, and Alabama.

38. *Aristida tenuispica* Hitchc. (Fig. 709.) Perennial; culms slender, 60 to 100 cm. tall; blades flat, 10 to 20 cm. long, 1 to 2 mm. wide, bearing scattered long hairs on the upper surface; panicle slender, about half the entire length of the culm; glumes nearly equal, about 8 mm. long; lemma 7 mm. long including a 1-mm. long beak; awns equal, 12 to 15 mm. long, spreading or reflexed, somewhat spirally contorted at base. 2 — Low pine barrens, peninsular Florida; British Honduras.

39. *Aristida condensata* Chapm. (Fig. 710.) Perennial; culms rather robust, a meter or more tall; lower sheaths usually appressed pubescent; blades firm, flat, becoming involute, elongate, 2 to 3 mm. wide; panicle narrow, as much as 30 cm. long, the branches 5 to 12 cm. long, ascending,

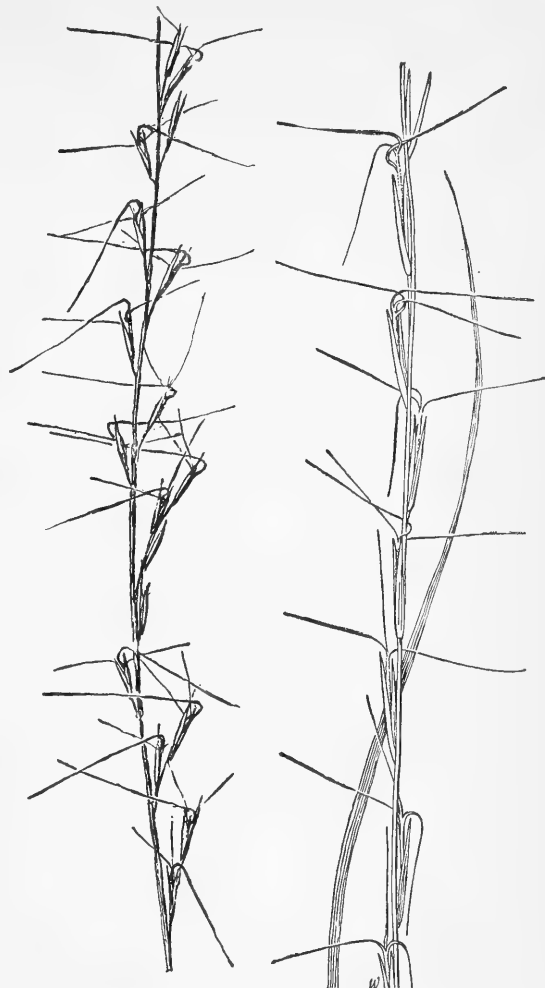


FIGURE 707.—*Aristida simpliciflora*, $\times 1$. (Chapman, Fla.)

FIGURE 708.—*Aristida mohrii*, $\times 1$. (Mohr 53, Ala.)



FIGURE 706.—*Aristida virgata*, $\times 1$. (Tracy 4667, Miss.)

closely flowered; glumes equal, 8 to 9 mm. long; awns equal, divergent, 10 to 15 mm. long, the base more or less contorted, finally forming a loose spiral. 2 —Sandy pine or oak barrens, North Carolina, Georgia, Florida, and Alabama, on the Coastal Plain. Specimens with glabrous lower sheaths have been differentiated as *A. condensata* var. *combsii* (Scribn. and Ball) Heur.

40. *Aristida gýrans* Chapm. (Fig. 711.) Perennial; culms erect, slender, 40 to 70 cm. tall; blades involute, 10 to 15 cm. long, 1 mm. wide; panicle slender, rather lax, 15 to 30 cm. long, the branches appressed, not at all or only slightly overlapping, bearing mostly 1 to 3 spikelets; first glume 7 to 8 mm. long, the second 10 to 11 mm. long; lemma about 6 mm. long,

the callus 1.5 mm. long, sharp; awns equal, divergent, 1 to 1.5 cm. long, about equally contorted at base in a loose spiral. 2 — Dry sandy soil, Georgia and Florida.

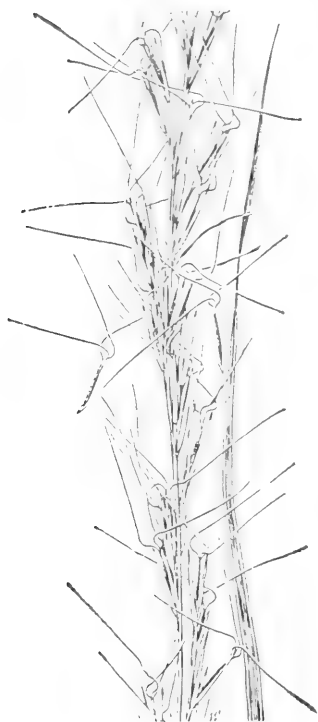


FIGURE 709.—*Aristida tenuispica*, $\times 1$. (Tracy 7104, Fla.)

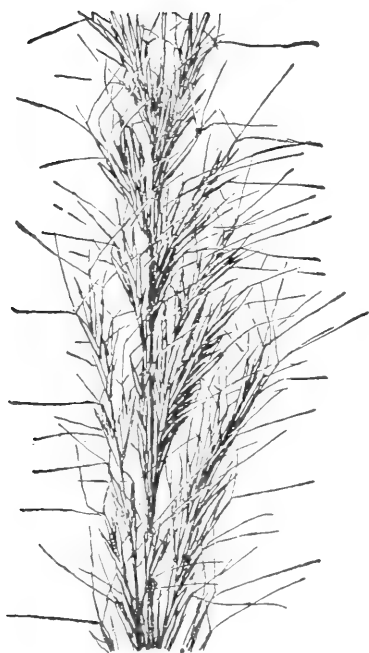


FIGURE 711.—*Aristida gyrans*, $\times 1$. (Combs 1289, Fla.)



FIGURE 710.—*Aristida condensata*, $\times 1$. (Chapman, Fla.)

TRIBE 6. ZOYSIEAE

93. TRÁGUS Hall.

(*Nazia* Adans.)

Spikelets 1-flowered, in small spikes of 2 to 5, the spikes sessile, falling entire, the spikelets sessile on a very short zigzag rachis, the first glumes small, thin, or wanting, appressed to the rachis, the second glumes of the 2 lower spikelets strongly convex with 3 thick nerves bearing a row of squarrose, stout hooked prickles along each side, the 2 second glumes forming the halves of a little bur, the upper 1 to 3 spikelets reduced and sterile; lemma and palea

thin, the lemma flat, the palea strongly convex. Low annuals, with flat blades and terminal inflorescence, the burs or spikes rather closely arranged along an elongate, slender axis. Type species, *Tragus racemosus*. Name from Greek *tragos*, he-goat, applied by Plinius to a plant.

Spikelets 2 to 3 mm. long, the apex scarcely projecting beyond the spines, the bur nearly sessile..... 1. *T. BERTERONIANUS*.
Spikelets 4 to 4.5 mm. long, the acuminate apex projecting beyond the spines, the bur pediceled..... 2. *T. RACEMOSUS*.

1. *Tragus berteronianus* Schult.
(Fig. 712.) Culms branched at base, spreading, 10 to 40 cm. long; blades firm, mostly less than 5 cm. long, 2 to 4 mm. wide, the cartilaginous margin bearing stiff white hairs or short slender teeth; raceme dense, 4 to 10 cm. long, 4 to 5 mm. thick; burs 2 to 3 mm. long, nearly sessile, the apex scarcely exceeding the

spines. ☉ (The name *Nazia aliena* Scribn. has been erroneously applied to the species.)—Dry open ground, probably introduced, Texas to Arizona, south to Argentina; also in the warmer parts of the Old World; on ballast at Boston and on wool waste in Maine.



FIGURE 712.—*Tragus berteronianus*. Plant, $\times \frac{1}{2}$; bur and spikelet, $\times 5$. (Hitchcock 3745, N. Mex.)



FIGURE 713.—*Tragus racemosus*, $\times 1$.
(Griffiths 1529, Ariz.)

2. *Tragus racemósus* (L.) All. (Fig. 713.) Differing from *T. berteronianus* in the larger burs, the spikelets 4 to 4.5 mm. long, in the acuminate apex projecting beyond the spines, and in the pediceled burs. ☉ (*Nazia racemosa* Kuntze.)—Waste ground and on ballast at a few places from Maine to North Carolina; Texas to Arizona; introduced from the Old World.

ANTHÉPHORA Schreb.

Spikelets with 1 perfect floret and a sterile lemma below, in clusters of 4, the indurate first glumes united at base, forming a pitcher-shaped pseudo-involucre, the clusters sessile and erect on a slender, flexuous, continuous axis, deciduous at maturity. Type species, *Antheophora elegans* Schreb. (*A. hermaphrodita*). Name from *anthe*, blossom, and *pherein*, to bear.

***Antheophora hermaphrodíta* (L.) Kuntze.** Leafy ascending or decumbent annual; culms mostly 20 to 50 cm. tall; blades flat, thin, 5 to 10 mm. wide; spikes erect, 5 to 10 cm. long; first glume 5 to 7 mm. long, about 9-nerved; second glume narrow, acuminate, shorter than the first, pubescent; sterile lemma 5-

nerved, about as long as the fertile floret. ☉ —Escaped from experiment station plots, Florida (Gainesville); a common weed in tropical America.

94. ZOÝSIA Willd.

(*Osterdamia* Neck.)

Spikelets 1-flowered, laterally compressed, appressed flatwise against the slender rachis, glabrous, disarticulating below the glumes; first glume wanting; second glume coriaceous, mucronate, or short-awned, completely infolding the thin lemma and palea, the palea sometimes obsolete. Low perennials, with creeping rhizomes, short, pungently pointed blades, and terminal spikelike racemes, the spikelets on short appressed pedicels. Type species, *Zoysia pungens* Willd. Named for Karl von Zois.

Several years ago a species of this genus was introduced into the United States as a lawngrass under the names Korean lawngrass and Japanese lawngrass. It was recommended for the Southern States and was said to be hardy as far north as Connecticut. The species then introduced appears to be *Zoysia japonica* Steud. Recently a fine-leaved species, *Zoysia tenuifolia* Willd. ex Trin. (Mascarene grass), has been introduced in Florida and southern California (called in the latter region Korean velvet grass) and has given favorable results. These species may escape from cultivation. The original species, *Z. matrella* (L.) Merr. (*Z. pungens* Willd.), Manila grass (fig. 714.) common in the Philippine Islands, has been used in recent years for lawns from the Gulf States to Long Island, propagated by cuttings. The spikelets are about 2.5 mm. long and 0.8 mm. wide. But little seed is produced. Sometimes called "Flawn."

In *Z. japonica* (Japanese lawngrass) the blades are flat and rather stiff, 2 to 4 mm. wide, the spikelets about 3 mm. long and a little more



FIGURE 714.—*Zoysia matrella*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 10$. (Whitford 1303, P. I.)

than 1 mm. wide. The rhizomes are underground. In *Z. tenuifolia* the blades are involute-capillary, the spikelets much narrower than in *Z. japonica*, and the stolons are at or near the surface of the soil.

95. HILÁRIA H. B. K.

Spikelets sessile, in groups of 3, the groups falling from the axis entire, the central spikelet (next the axis) fertile, 1-flowered (occasionally 2-flowered), the 2 lateral spikelets staminate, 2-flowered (occasionally 3-flowered); glumes coriaceous, those of the 3 spikelets forming a false involucre, in some species connate at the base, more or less asymmetric, usually bearing an awn on one side from about the middle (extension of the midnerve of the asymmetric glume); lemma and palea hyaline, about equal in length. Perennials, with stiff, solid culms and narrow blades, the groups of spikelets appressed to the axis, in terminal spikes. Type species, *Hilaria cenchroides* H. B. K. Named for Auguste St. Hilaire.

All the species are important range grasses and resist close grazing. Curly mesquite is the dominant "short grass" of the Texas plains. The larger species are well known on the range in the arid and semiarid regions of the Southwest.

- Culms white felty-pubescent..... 5. *H. RIGIDA*.
 Culms not felty-pubescent.
 Cluster of spikelets not flabellate; glumes of lateral spikelets narrowed toward summit..... 4. *H. JAMESII*.
 Cluster of spikelets flabellate; glumes (at least the outer one) of lateral spikelets broadest toward summit.
 Glumes subhyaline and fimbriate at summit; plants tufted, not stoloniferous..... 3. *H. MUTICA*.
 Glumes firm, not fimbriate; plants stoloniferous (except in *H. belangeri* var. *longifolia*).
 Glumes of lateral spikelets much shorter than the florets, pale; group of spikelets mostly 5 mm. long..... 1. *H. BELANGERI*.
 Glumes of lateral spikelets about equaling the florets, blackish; group of spikelets 7 to 8 mm. long..... 2. *H. SWALLONI*.

1. *Hilaria belangeri* (Steud.) Nash.

CURLY MESQUITE. (Fig. 715.) Plants in tufts, sending out slender stolons,

these producing new tufts, the internodes of the stolons wiry, 5 to 20



FIGURE 715.—*Hilaria belangeri*. Plant, $\times \frac{1}{2}$; two views of group of spikelets, $\times 5$; fertile spikelet, staminate spikelet, and fertile floret, $\times 5$. (Hitchcock, Tex.)

cm. long; culms erect, slender, 10 to 30 cm. tall, villous at the nodes; blades flat, 1 to 2 mm. wide, scabrous, more or less pilose, usually short, crowded at base, often forming a curly tuft, but sometimes longer and erect; spike usually 2 to 3 cm. long, with mostly 4 to 8 clusters of spikelets, the axis flat, the internodes alternately curved, 3 to 5 mm. long; group of spikelets 5 to 6 mm. long; lateral spikelets attenuate at base, the glumes united below, firm, scabrous, the outer lobe broadened upward, 2- to 3-nerved, the inner much reduced, the midnerve of both glumes extending into short awns, the first glume smaller, the lateral nerves sometimes excurrent into awns or teeth (the glumes variable in a single spike); fertile spikelet usually shorter than the sterile, rounded at base; glumes firm with deeply lobed thinner upper part, the midnerves extending into awns mostly exceeding the staminate spikelets; lemma compressed, narrowed above, awnless ♀ (*H. texana* Nash.)—Mesas and plains, Texas to Arizona and northern Mexico. *H. cenchroides* H. B. K., to which this species has commonly been referred, is confined to Mexico. *H. BELANGERI* var. *LONGIFOLIA* (Vasey) Hitchc. Stolons wanting; blades elongate. ♀ —Arizona and Sonora.

2. *Hilaria swalleni* Cory. (Fig. 716.) Resembling *H. belangeri*, culms to 35 cm. tall; blades usually 2 mm. wide, scarcely curled; spike 2 to 4.5 cm. long, with 3 to 8 clusters of spikelets, the internodes of the flat axis 4 to 6 mm. long; glumes of lateral spikelets similar, oblong, narrowed at base, about equaling the florets, firm and strongly pigmented except toward the summit, the nerves often rather obscure; awns of all glumes slightly longer than those of the preceding; fertile spikelet about equaling the sterile, the fertile floret slightly larger than in *H. belangeri*. ♀ —Mesas and rocky plains, western Texas and northern Mexico. Said to be better forage than *H. belangeri*.



FIGURE 716.—*Hilaria swalleni*. Two views of group of spikelets, $\times 5$. (Young 46, Tex.)



FIGURE 717.—*Hilaria mutica*, $\times 1$. (Toumey, Ariz.)

3. *Hilaria mutica* (Buckl.) Benth. TOBOSA GRASS. (Fig. 717.) Culms from a tough rhizomatous base, 30

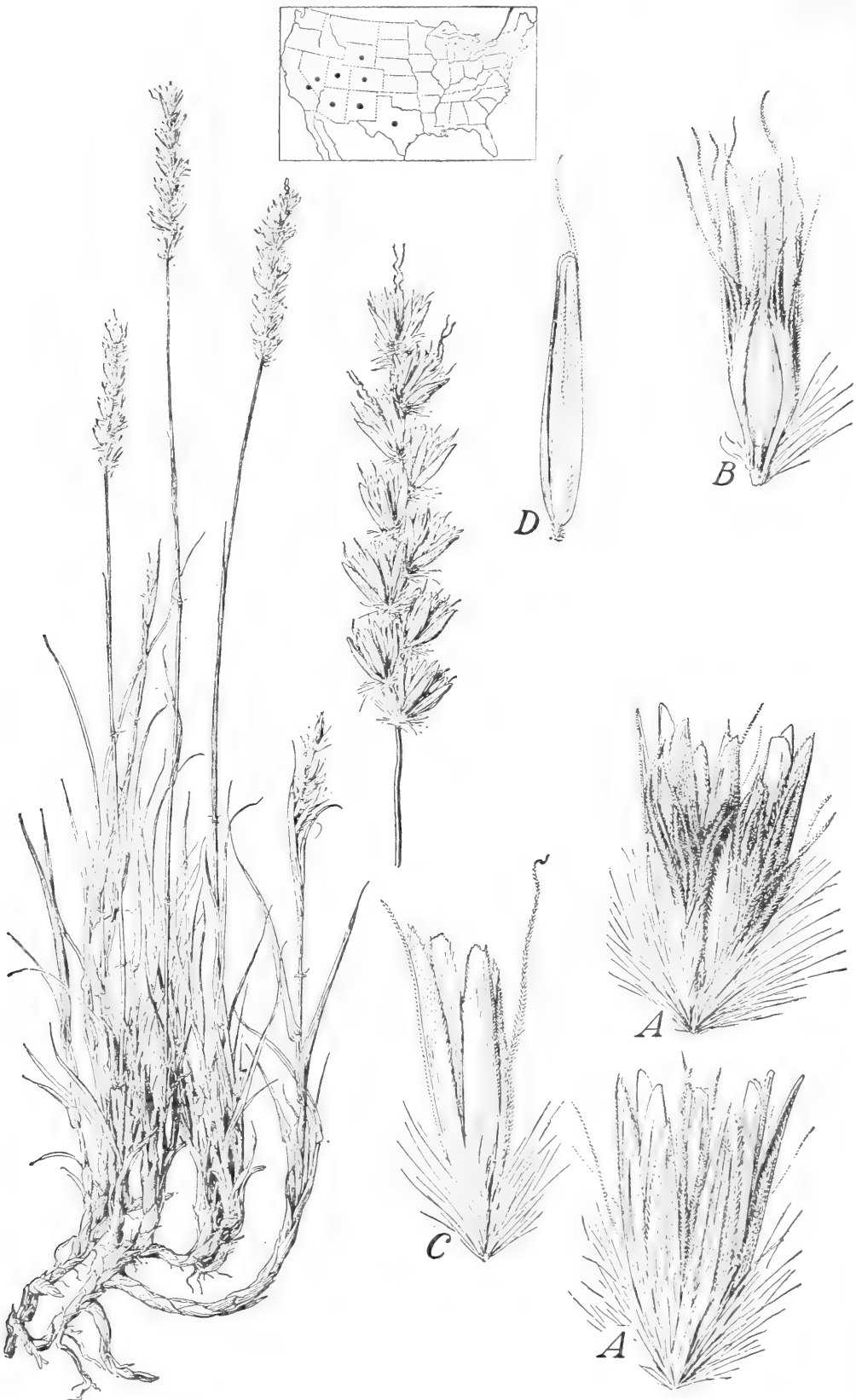


FIGURE 718.—*Hilaria jamesii*. Plant, $\times \frac{1}{2}$; single spike, $\times 1$; group of spikelets, two views (A), $\times 5$; fertile spikelet (B), staminate spikelet (C), and fertile floret (D), $\times 5$. (Tidestrom 1449, Utah.)

to 60 cm. tall, glabrous, the nodes pubescent; blades flat or somewhat involute, rather rigid, 2 to 3 mm. wide; spikes 4 to 6 cm. long; group of spikelets about 7 mm. long; bearded at base; glumes of lateral spikelets very unsymmetrical, widened toward the ciliate summit, the nerves flabellate, not excurrent or barely so; fertile spikelet about equaling the lateral ones, its glumes strongly keeled, cleft into few to several narrow ciliate lobes and slender awns; lemma exceeding the glumes, mucronate between 2 rounded lobes. 2 (Pleuraphis mutica Buckl.)—Dry plains and hills, Texas to Arizona and northern Mexico.

4. Hilaria jamesii (Torr.) Benth. GALLETA. (Fig. 718.) Plants erect, the base often decumbent or rhizomatous, bearing also tough scaly rhizomes; culms glabrous, the nodes villous; sheaths glabrous or slightly scabrous, sparingly villous around the short membranaceous ligule; blades mostly 2 to 5 cm. long, 2 to 4 mm. wide, rigid, soon involute, the upper reduced; group of spikelets 6 to 8 mm. long, long-villous at base, similar to those of *H. rigida*, but the glumes of lateral spikelets acute, usually with a single awn; lemma of the fertile spikelet exceeding its glumes. 2 (Pleuraphis jamesii Torr.)—Deserts, canyons, and dry plains, Wyoming and Utah to Texas and Inyo County, Calif.

5. Hilaria rigida (Thurb.) Benth. ex Scribn. BIG GALLETA. (Fig. 719.) Plants rather robust at base, branching, the branches mostly erect or ascending, the base rather woody, decumbent or rhizomatous; culms numerous, rigid, felty-pubescent, glabrate and scabrous above, 50 to 100 cm. tall; leaves felty or glabrous, usually woolly at the top of the sheath; blades spreading, 2 to 5 cm. long, or longer on sterile shoots, 2 to 4 mm. wide, more or less involute, acuminate into a rigid coriaceous point; group of spikelets about 8 mm. long, densely bearded at base; glumes

of lateral spikelets thin, long-ciliate, about 7-nerved, usually 2- to 4-lobed at the broad summit and with 1 to 3 nerves excurrent into slender awns, nerves sometimes obscure and scarcely excurrent (variable in a single spike); fertile spikelet about equaling the lateral ones, its narrow glumes deeply cleft into few to several acuminate ciliate lobes and slender awns; lemma scarcely exceeding the glumes, thin, ciliate, 2-lobed, the midnerve excurrent into a short awn. 2 (Pleuraphis rigida Thurb.)—Deserts, southern Utah and Nevada to Arizona, southern California, and Sonora.



FIGURE 719.—*Hilaria rigida*, $\times 1$. (Palmer 494, Utah.)

96. AEGOPÓGON Humb. and Bonpl. ex Willd.

Spikelets on short flat pedicels, in groups of 3, the group short-pedunculate, spreading, the peduncle disarticulating from the axis and forming a pointed stipe below the group, this falling entire; central spikelet shorter pedicellate, fertile, the two lateral ones longer pedicellate and staminate or neuter; glumes membranaceous, notched at the apex, the



FIGURE 720.—*Aegopogon tenellus*. Plant, $\times \frac{1}{2}$; group of spikelets, $\times 5$; lateral spikelets and central spikelet, $\times 10$. (Pringle 1407, Mexico.)

midnerve extending into a delicate awn; lemma and palea thinner than the glumes, extending beyond them, the lemma 3-nerved, the central nerve and sometimes also the lateral ones extending into awns, the palea 2-awned. Low, lax annuals, with short, narrow, flat blades and loose racemes of delicate groups of spikelets. Type species, *Aegopogon cenchroides* Humb. and Bonpl. Name from Greek *aix*,

goat, and *pogon*, beard, alluding to the fascicle of awns of the spikelets.

1. *Aegopogon tenellus* (DC.) Trin. (Fig. 720.) Culms 10 to 20 cm. long, usually spreading or decumbent; blades 1 to 2 mm. wide; racemes 3 to 5 cm. long; spikelets, excluding awns, about 2 mm. long; lemma and palea of lateral spikelets broad and rounded at summit with a single delicate awn, those of the fertile

spikelet narrower, with one long and 2 short awns. ☉ —Open ground, mountains of southern Arizona, south to northern South America. Lateral spikelets sometimes reduced or rudi-

mentary (var. *abortivus* (Fourn.) Beetle), but such spikelets and also central spikelets with reduced awns are found in plants with normal spikelets.

TRIBE 7. CHLORIDEAE

97. LEPTOCHLOA Beauv. SPRANGLETOP

Spikelets 2- to several-flowered, sessile or short-pediceled, approximate or somewhat distant along one side of a slender rachis, the rachilla disarticulating above the glumes and between the florets; glumes unequal or nearly equal, awnless or mucronate, 1-nerved, usually shorter than the first lemma; lemmas obtuse or acute, sometimes 2-toothed and mucronate or short-awned from between the teeth, 3-nerved, the nerves sometimes pubescent. Annuals or perennials, with flat blades and numerous usually slender spikes or racemes borne on a common axis forming a long or sometimes short panicle. Type species, *Leptochloa virgata*. Name from Greek *leptos*, slender, and *chloa*, grass, alluding to the slender spikes.

The only species of *Leptochloa* important as a forage grass is *L. dubia*, or sprangletop, of the Southwest, useful for grazing and for hay.

Plants perennial.

Lemmas broad, notched at apex, the lateral nerves glabrous..... 1. *L. DUBIA*.

Lemmas acute or awned, the lateral nerves pubescent.

Lemmas about 3 mm. long; panicle flabellate, the axis short.... 2. *L. CHLORIDIFORMIS*.

Lemmas about 1.5 mm. long; panicle oblong, the axis relatively long.

Sheaths and blades glabrous; lemmas awnless or nearly so..... 3. *L. VIRGATA*.

Sheaths and blades sparsely pilose; lemmas awned..... 4. *L. DOMINGENSIS*.

Plants annual.

Sheaths papillose-pilose; first floret not longer than the second glume; spikelets mostly

1 to 2 mm. long..... 5. *L. FILIFORMIS*.

Sheaths smooth or scabrous, not pilose; spikelets more than 2 mm. long.

Lemmas awned, awns sometimes minute. Culms freely branching.

Lemmas viscid on the back; panicle oval, usually less than 10 cm. long, the longer branches usually less than 5 cm. long; second glume 1.5 mm. long.

6. *L. VISCIDA*.

Lemmas not viscid; panicle more than 10 cm. long, the longer branches usually as much as 10 cm. long; second glume 3 mm. long..... 7. *L. FASCICULARIS*.

Lemmas awnless or mucronate only.

Lemmas obtuse, sometimes mucronate.

Spikelets 5 to 7 mm. long, 6- to 9-flowered, lead color..... 8. *L. UNINERVIA*.

Spikelets 2 to 3 mm. long, 3- to 4-flowered, pale..... 9. *L. NEALLEYI*.

Lemmas acuminate.

Sheaths scabrous, keeled and compressed..... 10. *L. SCABRA*.

Sheaths smooth or slightly scabrous near apex, scarcely keeled or compressed.

11. *L. PANICOIDES*.

1. *Leptochloa dubia* (H. B. K.)

Nees. GREEN SPRANGLETOP. (Fig. 721.) Perennial; culms wiry, erect, 50 to 100 cm. tall; sheaths glabrous; blades flat or sometimes folded or loosely involute, scabrous, as much as 1 cm. wide, usually narrower; panicle of few to many spreading or ascending racemes 3 to 12 cm. long, approximate or somewhat distant on an axis as much as 15 cm. long; spikelets 5- to 8-flowered (or in re-

duced specimens only 2-flowered), 5 to 10 mm. long; lemmas broad, glabrous on the internerves, obtuse or emarginate, the midnerve sometimes extending into a short point, the florets at maturity widely spreading, very different in appearance from their early phase. 21 —Rocky hills and canyons and sandy soil, southern Florida; Oklahoma and Texas to Arizona, south through Mexico; Ar-

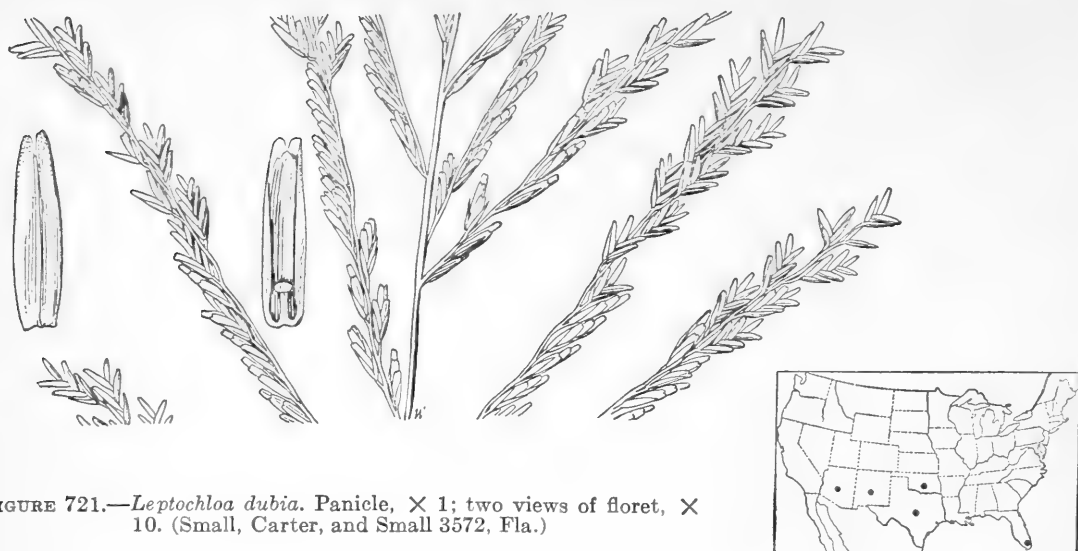


FIGURE 721.—*Leptochloa dubia*. Panicle, $\times 1$; two views of floret, $\times 10$. (Small, Carter, and Small 3572, Fla.)

gentina. Racemes of cleistogamous spikelets are often found in the sheaths.

2. *Leptochloa chloridifórmis* (Hack.) Parodi. (Fig. 722.) Robust tufted perennial, somewhat glaucous; culms erect, 80 to 150 cm. tall; sheaths scaberulous; ligule a dense line of white hairs, 1 to 2 mm. long; blades erect, elongate, flat, rather firm, 3 to 4 mm. wide, villous on the upper surface near the base, the margins scabrous, long-attenuate; panicle long-exserted; spikes numerous (usually 10 to 15), pale or stramineous, erect at base, flabellate or outcurved above, 10 to 15 cm. long, aggregate in 2 or 3 whorls on an axis 3 to 4 cm. long; spikelets closely imbricate on a rachis 0.5 mm. wide, 4-flowered, about 4 mm. long; glumes acute, the first 1.5 mm. long, the second 2.5 to 3 mm. long; lemmas keeled, pilose on the margins nearly to apex, the mid-nerve extending beyond the obtuse tip as a minute mucro, the first and second florets about 3 mm. long, the other shorter, not extending much beyond the first two. $\text{\textcircled{2}}$ — Dry open ground, Cameron County, Tex.; Paraguay and Argentina.

3. *Leptochloa virgáta* (L.) Beauv. (Fig. 723.) Perennial; culms wiry, erect, 50 to 100 cm. tall; blades flat; racemes several to many, slender, laxly ascending, 5 to 10 cm. long, the

lower distant, the others often aggregate; spikelets nearly sessile, mostly 3- to 5-flowered; lemmas 1.5 to 2 mm. long, awnless or the lower with a short awn. $\text{\textcircled{2}}$ — Open ground and grassy slopes, southern Florida and southern Texas; tropical America.

4. *Leptochloa domingénsis* (Jacq.) Trin. (Fig. 724.) Resembling *L. virgáta*; sheaths and blades sparsely pilose; panicle more elongate, the racemes shorter and more numerous; lemmas appressed-pubescent on the internerves, awned, the awn of the lower florets 1 to 3 mm. long. $\text{\textcircled{2}}$ — Open ground and grassy slopes, southern Florida; Texas; tropical America.

5. *Leptochloa filifórmis* (Lam.) Beauv. RED SPRANGLETOP. (Fig. 725.) Annual; the foliage and panicles often reddish or purple; culms erect or branching and geniculate below, 40 to 70 cm. tall, or often dwarf; sheaths papillose-pilose, sometimes sparsely so; blades flat, thin, as much as 1 cm. wide; panicle somewhat viscid, of numerous approximate slender racemes 5 to 15 cm. long, on an axis mostly about half the entire length of the culm; spikelets 3- to 4-flowered, 1 to 2 mm. long, rather distant on the rachis; glumes acuminate, longer than the first floret, often as long as the spikelet; lemmas awnless, pubescent on the nerves, 1.5 mm. long. $\text{\textcircled{C}}$

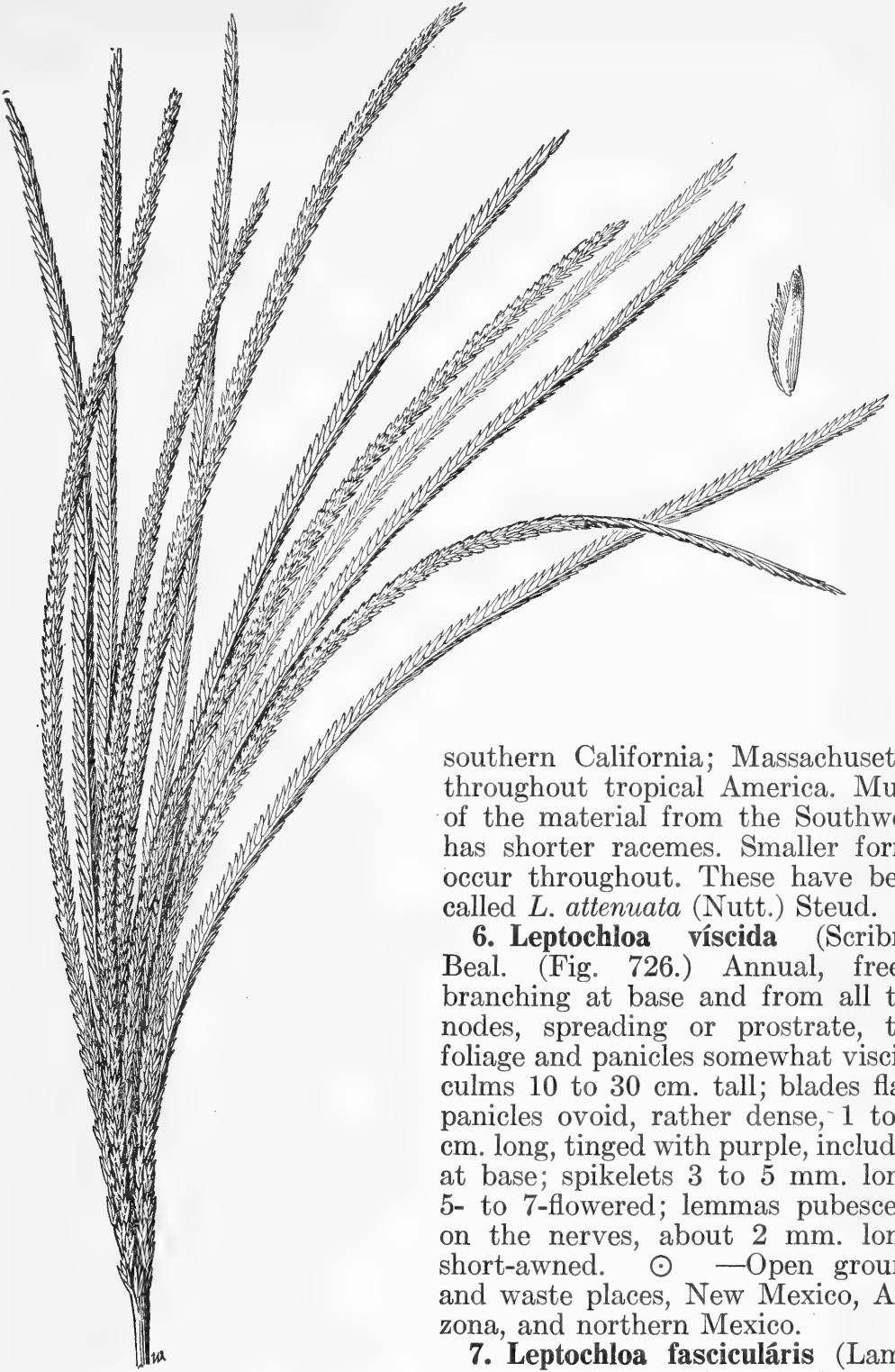


FIGURE 722.—*Leptochloa chloridiformis*. Panicle, $\times 1$; floret, $\times 10$. (Silveus 622, Tex.)

(*L. mucronata* Kunth.)—Open or shady ground, a common weed in gardens and fields, Virginia to southern Indiana and eastern Kansas, south to Florida and Texas, west to

southern California; Massachusetts; throughout tropical America. Much of the material from the Southwest has shorter racemes. Smaller forms occur throughout. These have been called *L. attenuata* (Nutt.) Steud.

6. *Leptochloa viscida* (Scribn.) Beal. (Fig. 726.) Annual, freely branching at base and from all the nodes, spreading or prostrate, the foliage and panicles somewhat viscid; culms 10 to 30 cm. tall; blades flat; panicles ovoid, rather dense, 1 to 8 cm. long, tinged with purple, included at base; spikelets 3 to 5 mm. long, 5- to 7-flowered; lemmas pubescent on the nerves, about 2 mm. long, short-awned. ☉ —Open ground and waste places, New Mexico, Arizona, and northern Mexico.

7. *Leptochloa fasciculáris* (Lam.) A. Gray. (Fig. 727.) Annual, somewhat succulent; culms erect to spreading or prostrate, freely branching, 30 to 100 cm. tall; blades flat to loosely involute; panicles more or less included, mostly 10 to 20 cm. long, often smaller, occasionally longer, the racemes several to numerous, as much



FIGURE 723.—*Leptochloa virgata*. Panicle, $\times 1$; floret, $\times 10$. (Wilson 9402, Cuba.)

as 10 cm. long, usually ascending or appressed, or at maturity spreading; spikelets usually overlapping, 7 to 12 mm. long, 6- to 12-flowered; lemmas 4 to 5 mm. long, the lateral nerves pubescent below, acuminate, the awn from short to as long as the body. \odot (*Diplachne fascicularis* Beauv.)
—Brackish marshes along the coast,

the panicle more oblong in outline, with shorter, denser-flowered racemes; spikelets 5 to 7 mm. long, 6- to 9-flowered, lead-color; glumes broader, more obtuse; lemmas scarcely narrowed toward tip, apiculate but not awned, the lateral nerves more or less excurrent. \odot (*L. imbricata* Thurb.)—Ditches and

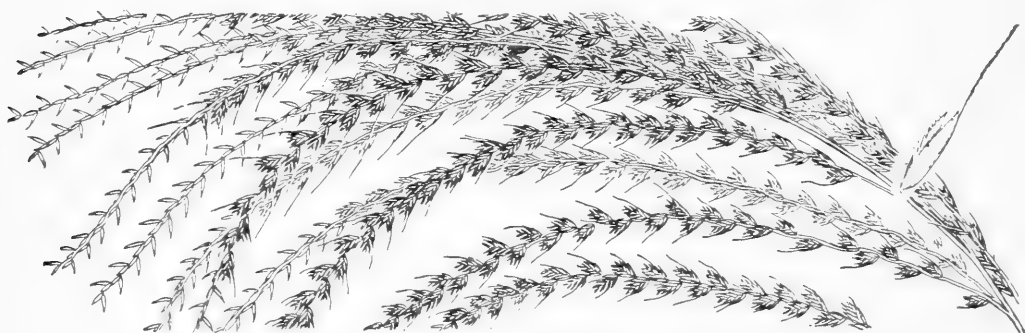


FIGURE 724.—*Leptochloa domingensis*. Panicle, $\times 1$; floret, $\times 10$. (Hitchcock 10055, Trinidad.)

New Hampshire and New York to Florida and Texas and in alkali flats, ditches, and marshes, Ohio to North Dakota; Washington and Colorado to New Mexico, Arizona, and California; south through tropical America to Argentina. A prostrate form has been called *Diplachne procumbens* (Muhl.) Nash and *D. maritima* Bickn.

8. *Leptochloa uninervia* (Presl) Hitchc. and Chase. (Fig. 728.) Resembling *L. fascicularis*, rather sparingly branching, usually strictly erect,

moist places, North Carolina; Mississippi to Texas; Colorado and New Mexico to Oregon and California, south to Mexico; Peru to Argentina; introduced in Maine, Massachusetts, and New Jersey.

9. *Leptochloa nealléyi* Vasey. (Fig. 729.) Annual, usually erect and rather robust; culms mostly 1 to 1.5 m. tall, simple or sparingly branching at base; sheaths glabrous or slightly scabrous, mostly keeled; blades elongate, flat to loosely involute; panicle commonly 25



FIGURE 725.—*Leptochloa filiformis*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 10$. (Ruth 51, Tenn.)



FIGURE 726.—*Leptochloa viscida*. Panicle, $\times 1$; floret, $\times 10$. (Mearns 833, Ariz.)

to 50 cm. long, not more than 4 cm. wide, the racemes subverticillate, overlapping, 2 to 4 cm. long, appressed or ascending; spikelets crowded, 3- or 4-flowered, 2 to 3 mm. long; lemmas about 1.5 mm. long, obtuse, the nerves sparingly pubescent, the lateral close to the margin. ☉ —Marshes, mostly near the coast, Louisiana (Cameron) and Texas; also eastern Mexico.

10. *Leptochloa scábra* Nees. (Fig. 730.) Annual; culms erect, about 1 m. tall, somewhat robust and succulent,

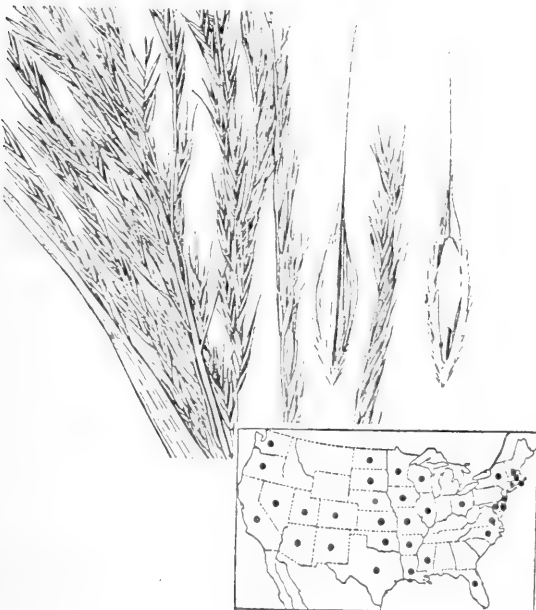


FIGURE 727.—*Leptochloa fascicularis*. Panicle, $\times 1$; two views of floret, $\times 10$. (Hitchcock 7876, Md.)

sparingly branching; sheaths and blades scabrous, the blades elongate, 8 to 12 mm. wide; panicle 20 to 40 cm. long, not more than 7 cm. wide, usually less, the slender racemes crowded, 4 to 8 cm. long, ascending or somewhat drooping, usually curved or flexuous; spikelets crowded, mostly 3-flowered, about 3 mm. long; lemmas acute, awnless, the nerves pubescent. ☉ —Marshes and ditches, Louisiana (near New Orleans) and tropical America.

11. *Leptochloa panicoídes* (Presl) Hitchc. (Fig. 731.) Annual; culms erect or spreading, 50 to 100 cm. tall, branching; sheaths glabrous; blades

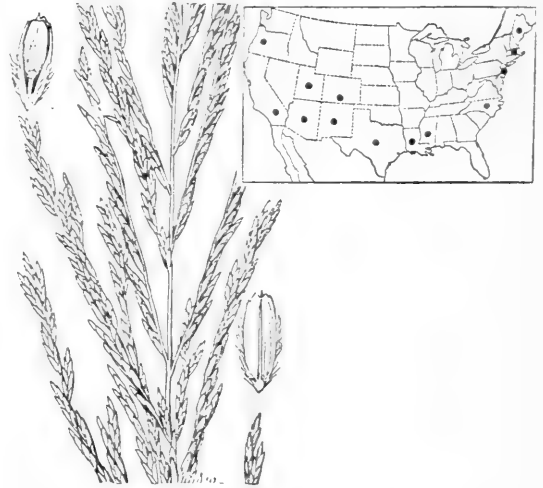


FIGURE 728.—*Leptochloa uninervia*. Panicle, $\times 1$; two views of floret, $\times 10$. (Tharp 3123, Tex.)

thin, 5 to 10 mm. wide, scaberulous; panicle oblong, 10 to 20 cm. long, 3 to 5 cm. wide, the racemes approximate, 3 to 5 cm. long, ascending, rather lax; spikelets 5- to 7-flowered, 4 to 5 mm. long; lemmas 2.5 mm. long, apiculate, the lateral nerves minutely pubescent at base. ☉ (*L. floribunda* Doell.)—Indiana (Posey County) and Missouri to Mississippi (Holmes County), Arkansas, and Texas; Brazil.

98. TRICHONEŪRA Anderss.

Spikelets few-flowered, the rachilla disarticulating above the glumes, the internodes pilose at base, disarticulating near their summit, the upper part

forming a short callus below the floret; glumes about equal, 1-nerved, long-acuminate, mostly as long as the spikelet or longer; lemmas bidentate, 3-nerved, the lateral nerves near the margin, the midnerve usually excurrent as a short awn, the margins long-ciliate; palea broad, the nerves near the margin. Annuals or perennials with simple panicles, the spikelets short-pedicel along one side of the main branches. Type species, *Trichoneura hookeri* Anderss. Name from Greek *thrix*, hair, and *neuron*, nerve, alluding to the ciliate nerves of the lemma.



FIGURE 729.—*Leptochloa nealleyi*. Panicle, $\times 1$; two views of floret, $\times 10$. (Fisher 25, Tex.)

1. *Trichoneura elegans* Swallen. (Fig. 732.) Annual, branching at base; culms erect, rather robust, or ascending, 40 to 110 cm. tall, several-noded; sheaths scaberulous; blades flat, or subinvolute toward the tip, scabrous, elongate, 3 to 7 mm. wide; panicle erect, 10 to 18 cm. long, the axis angled, scabrous; branches numerous, stiffly ascending, the lower 5 to 8 cm. long, rather densely flowered; spikelets mostly 5- to 8-flowered, 9 to 10 mm. long; glumes about equaling the spikelet, the setaceous tips slightly

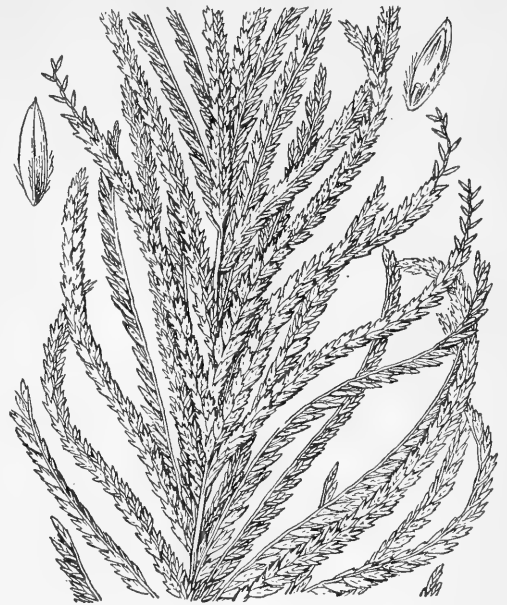


FIGURE 730.—*Leptochloa scabra*. Panicle, $\times 1$; two views of floret, $\times 10$. (Tracy 8388, La.)

spreading; lemmas scaberulous toward the obtuse minutely lobed summit, the awn minute, the margins conspicuously ciliate on the lower half to two-thirds, the hairs as much as 1 mm. long. ☉ —Sandy soil, southern Texas.

99. TRIPÓGON Roth

Spikelets several-flowered, subsessile, appressed in 2 rows along one

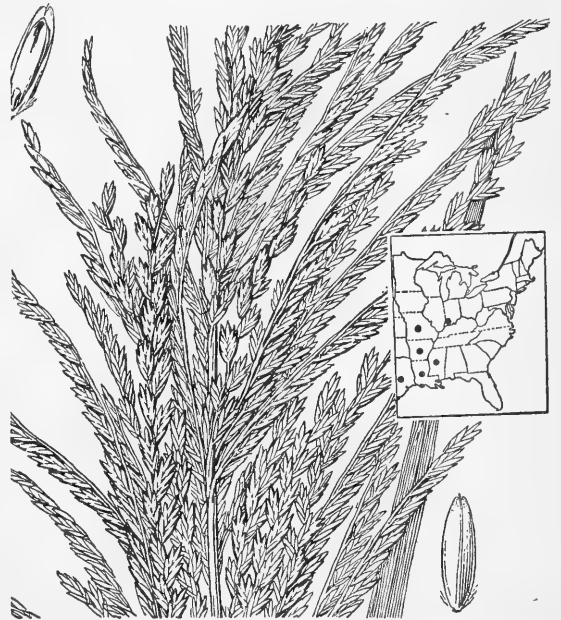


FIGURE 731.—*Leptochloa panicoides*. Panicle, $\times 1$; two views of floret, $\times 10$. (Tracy 7451, Miss.)



FIGURE 732.—*Trichoneura elegans*. Plant, $\times 1$; spikelet and floret, $\times 10$. (Type.)

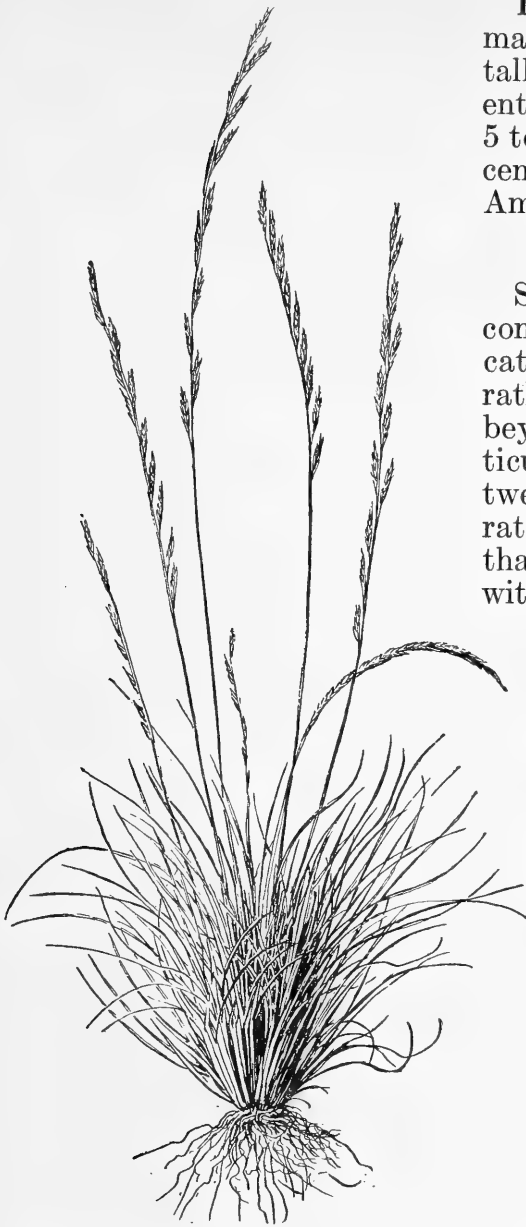


FIGURE 733.—*Tripogon spicatus*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Nealley 78, Tex.)

1. *Tripogon spicatus* (Nees) Ekman. (Fig. 733.) Culms 10 to 20 cm. tall; spike from one-fourth to half the entire height of the plant; spikelets 5 to 8 mm. long. 2 —Rocky hills, central Texas, Mexico; Cuba; South America.

100. ELEUSINE Gaertn.

Spikelets few to several-flowered, compressed, sessile and closely imbricate, in 2 rows along one side of a rather broad rachis, not prolonged beyond the spikelets; rachilla disarticulating above the glumes and between the florets; glumes unequal, rather broad, acute, 1-nerved, shorter than the first lemma; lemmas acute, with 3 strong green nerves close to-

side of a slender rachis, the rachilla disarticulating above the glumes and between the florets; glumes somewhat unequal, acute or acuminate, narrow, 1-nerved; lemmas narrow, 3-nerved, bearing at base a tuft of long hairs, the apex bifid, the midnerve extending as a short awn. Our species a low, tufted perennial, with capillary blades and slender solitary spikes, the spikelets somewhat distant. Type species, *Tripogon bromoides* Roth. Name from Greek *treis*, three, and *pogon*, beard, alluding to the hairs at the base of the three nerves of the lemma.

gether, forming a keel, the uppermost somewhat reduced; seed dark brown, roughened by fine ridges, loosely enclosed in the thin pericarp. Annuals, with 2 to several rather stout spikes, digitate at the summit of the culms, sometimes with 1 or 2 a short distance below, or rarely with a single spike. Type species, *Eleusine coracana*. Name from Eleusis, the town where Demeter was worshipped.

1. *Eleusine indica* (L.) Gaertn. GOOSEGRASS. (Fig. 734.) Branching at base, ascending to prostrate, very smooth; culms compressed, usually



FIGURE 734.—*Eleusine indica*. Plant, $\times \frac{1}{2}$; spikelet, floret, and seed (without pericarp), $\times 5$. (Fredholm 5331, Fla.)

less than 50 cm. long, but sometimes as much as 1 m.; blades flat or folded, 3 to 8 mm. wide; spikes mostly 2 to 6, rarely more, or but 1 in depauperate plants, flat, 4 to 15 cm. long. ☉ —Waste places, fields, and open ground, Massachusetts to South Dakota and Kansas, south to Florida and Texas; occasional in Oregon, Utah, Arizona, and California; introduced; a common weed in the warmer regions of both hemispheres.

Eleusine tristachya (Lam.) Lam. Spikes 1 to 3, rarely more, 1 to 2.5 cm. long, 8 to 10 mm. thick; resembling *E. indica*, but the spikes short and thick. ☉ —On ballast, Camden, N. J. and Mobile, Ala.; Portland, Oreg. and elsewhere; tropical Africa; introduced in tropical South America.

Eleusine coracana (L.) Gaertn. AFRICAN MILLET. More robust than *E. indica*; spikes thicker, heavier, sometimes incurved at the tip, brownish at maturity. A cultivated form of *E. indica*; the seed used for food among primitive peoples in Africa and southern Asia. ☉ —Occasionally grown at experiment stations. Called also ragi, coracan millet, and finger millet.

101. DACTYLOCTENIUM Willd.

Spikelets 3- to 5-flowered, compressed, sessile and closely imbricate, in two rows along one side of the rather narrow flat rachis, the end projecting in a point beyond the spikelets; rachilla disarticulating above the first glume and between the florets; glumes somewhat unequal, broad, 1-nerved, the first persistent upon the rachis, the second mucronate or short-awned below the tip, deciduous; lemmas firm, broad, keeled, acuminate or short-awned, 3-nerved, the lateral nerves indistinct, the upper floret reduced; palea about as long as the lemma; seed subglobose, ridged or wrinkled, enclosed in a thin, early-disappearing pericarp. Annuals or perennials with flat blades and 2 to several short thick spikes, digitate and widely spreading at the summit

of the culms. Type species, *Dactyloctenium aegyptium*. Name from Greek *daktulos*, finger, and *ktenion*, a little comb, alluding to the pectinate arrangement of the spikelets.

1. Dactyloctenium aegyptium (L.) Beauv. (Fig. 735.) Culms compressed, spreading with ascending ends, rooting at the nodes, branching, commonly forming radiate mats, usually 20 to 40 cm. long, sometimes as much as 1 m.; blades flat, ciliate; spikes 1 to 5 cm. long. ☉ —Open ground, waste places, and fields, Coastal Plain, North Carolina to Florida and Texas; also occasional at more northern points (Maine to New Jersey; Illinois); Colorado, Arizona, and California; tropical America; introduced from Old World Tropics.

102. MICROCHLOA R. Br.

Spikelets 1-flowered, awnless, sessile in 2 rows along one side of a narrow flattened rachis, the rachilla disarticulating above the glumes; glumes subequal, longer than the floret, acute, 1-nerved; floret with a soft, pointed callus; lemma thin, 3-nerved, flabellate; palea narrow, a little shorter than the lemma. Slender perennials with simple culms and slender solitary falcate spikes. Type species, *Microchloa setacea* R. Br. Name from the Greek *micros*, small, and *chloe*, grass.

1. Microchloa kúnthii Desv. (Fig. 736.) Perennial; culms very slender, erect in small dense tufts, 10 to 30 cm. tall; sheaths, except the lowermost, much shorter than the internodes, scaberulous; ligule ciliate, 1 to 1.5 mm. long; blades firm, flat or usually folded, with thick white scabrous margins, those of the culm 1 to 2.5 cm. long, those of the innovations to 6 cm. long, 1 to 1.5 mm. wide; spike 6 to 15 cm. long, falcate, the rachis ciliate; spikelets 2.5 to 3.5 mm. long; lemma 2 to 2.5 mm. long, pilose on the midnerve, the margins densely ciliate with hairs about 1 mm. long. ☉ —Granitic outcrop on rocky slope, Carr Canyon, Huachuca Mountains,



FIGURE 735.—*Dactyloctenium aegyptium*. Plant, $\times \frac{1}{2}$; spikelet, floret, and seed (without pericarp), $\times 5$.
(Small and Heller 378, N. C.)

southern Arizona; Mexico and Guatemala.

103. *CYNODON* L. Rich.

(*Capriola* Adans.)

Spikelets 1-flowered, awnless, sessile in 2 rows along one side of a slender continuous rachis and appressed to it, the rachilla disarticulating above the glumes and prolonged behind the palea as a slender naked bristle, sometimes bearing a rudimentary lemma; glumes narrow, acuminate, 1-nerved, about equal, shorter than the floret; lemma firm, strongly compressed, pubescent on the keel, 3-nerved, the lateral nerves close to the margins. Perennial, usually low grasses, with creeping stolons or rhizomes, short blades, and several slender spikes digitate at the summit of the upright culms. Type species, *Cynodon dactylon*. Name from *kuon* (*kun-*), dog, and *odous*, tooth, alluding to the sharp hard scales of the rhizome.

1. *Cynodon dactylon* (L.) Pers. BERMUDA GRASS. (Fig. 737.) Extensively creeping by scaly rhizomes or by strong flat stolons, the old bladeless sheaths of the stolon and the lowest one of the branches often forming conspicuous pairs of "dog's teeth"; flowering culms flattened, usually erect or ascending, 10 to 40 cm. tall; ligule a conspicuous ring of white hairs; blades flat, glabrous or pilose on the upper surface, those of the innovations often conspicuously distichous; spikes usually 4 or 5, 2.5 to 5 cm. long; spikelets imbricate, 2 mm. long; the lemma boat-shaped, acute. 2 (*Capriola dactylon* Kuntze.)—Open ground, grassland, fields, and waste places, common, Maryland to Oklahoma, south to Florida and Texas, west to California; also occasional north of this region (Massachusetts to Michigan, Oregon); warm regions of both hemispheres, introduced in America. Bermuda grass is the most important pasture grass of the Southern States, and is also widely utilized there as a lawngrass.

On alluvial ground it may grow sufficiently rank to be cut for hay. It propagates readily by its rhizomes and stolons, and on this account may become a troublesome weed in cultivated fields. This grass is known also as wire-grass (especially the weedy form in fields). A more robust form,



FIGURE 736.—*Microchloa kunthii*. Plant, $\times \frac{1}{2}$. (Conzatti 3605, Mexico.)

found along the seacoast of Florida, has been called *C. maritimus* H. B. K., though the type of that (from Peru) is characteristic *C. dactylon*. There are large areas of Bermuda grass around the Roosevelt Dam,

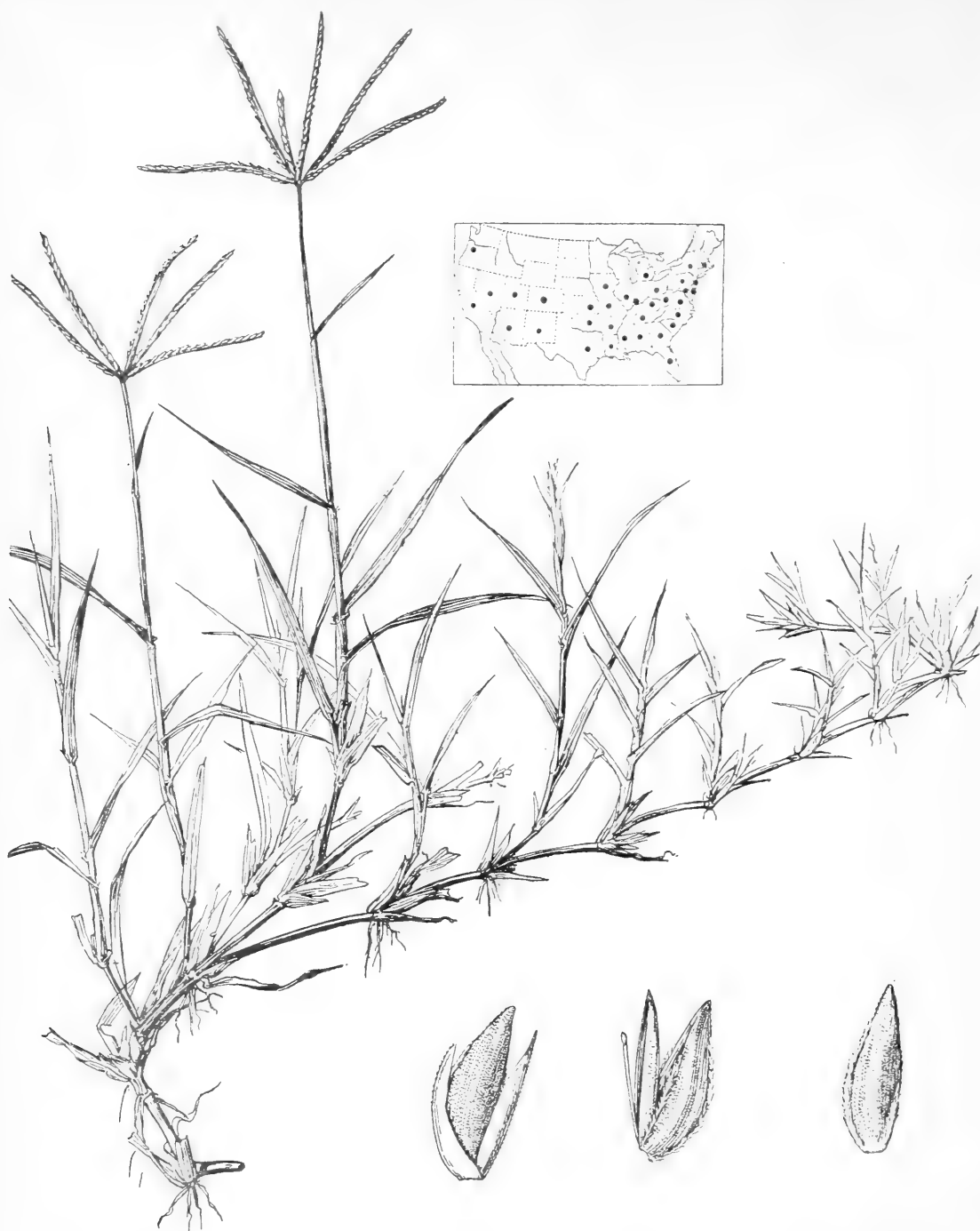


FIGURE 737.—*Cynodon dactylon*. Plant, $\times \frac{1}{2}$; spikelet and two views of floret, $\times 5$. (Kearney, Tenn.)

Ariz., where it survives submergence and furnishes grazing at low water.

CYNODON TRANSVAALÉNSIS Davy. Extensively creeping with fine foliage, the blades rarely more than 1 mm. wide; spikes mostly 2 or 3, the spikelets a little narrower and the glumes shorter than in *C. dactylon*.
 2 —Coming into cultivation as a lawn-grass, escaped, Ames, Iowa, and Bard, Calif. Introduced from South Africa.

104. WILLKÓMMIA Hack.

Spikelets 1-flowered, dorsally compressed, sessile in 2 rows on one side of a slender rachis and appressed to it, the rachilla somewhat lengthened below and above the second glume, disarticulating just above it, not prolonged above the floret; glumes thin,

unequal, the first narrow, nerveless, the second 1-nerved; lemma awnless, 3-nerved, the lateral nerves near the margin, the back of the lemma sparingly pubescent between the nerves, the margins densely covered with silky hairs; nerves of the palea densely silky hairy. Annuals or perennials, with several short spikes racemose on a slender axis; our species a low tufted perennial. Type species, *Willkommia sarmentosa* Hack. Named for H. M. Willkomm.

1. *Willkommia texana* Hitchc. (Fig. 738.) Culms erect to spreading, 20 to 40 cm. tall; blades flat or more or less involute, short; spikes few to several, 2 to 5 cm. long, somewhat overlapping or the lower distant, appressed, the axis 4 to 15 cm. long; spikelets about 4 mm. long, narrow, acute; first glume about two-thirds as long as the second, obtuse; second glume subacute; lemma about as long as the second glume. ♀ — Spots of hardpan, central and southern Texas. A stoloniferous form has been found in Argentina.

105. *SCHEDONNARDUS* Steud.

Spikelets 1-flowered, sessile and somewhat distant in 2 rows on one side of a slender, continuous 3-angled rachis, appressed to its slightly concave sides, the rachilla disarticulating above the glumes, not prolonged; glumes narrow, stiff, somewhat unequal, acuminate, 1-nerved; lemmas narrow, acuminate, a little longer than the glumes, 3-nerved. Low,

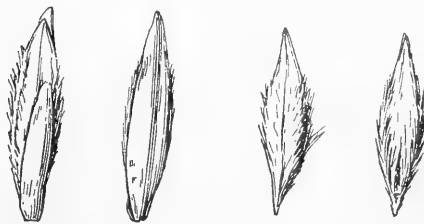


FIGURE 738.—*Willkommia texana*. Plant, $\times \frac{1}{2}$; two views of spikelet and floret, $\times 5$. (Tracy 8903, Tex.)

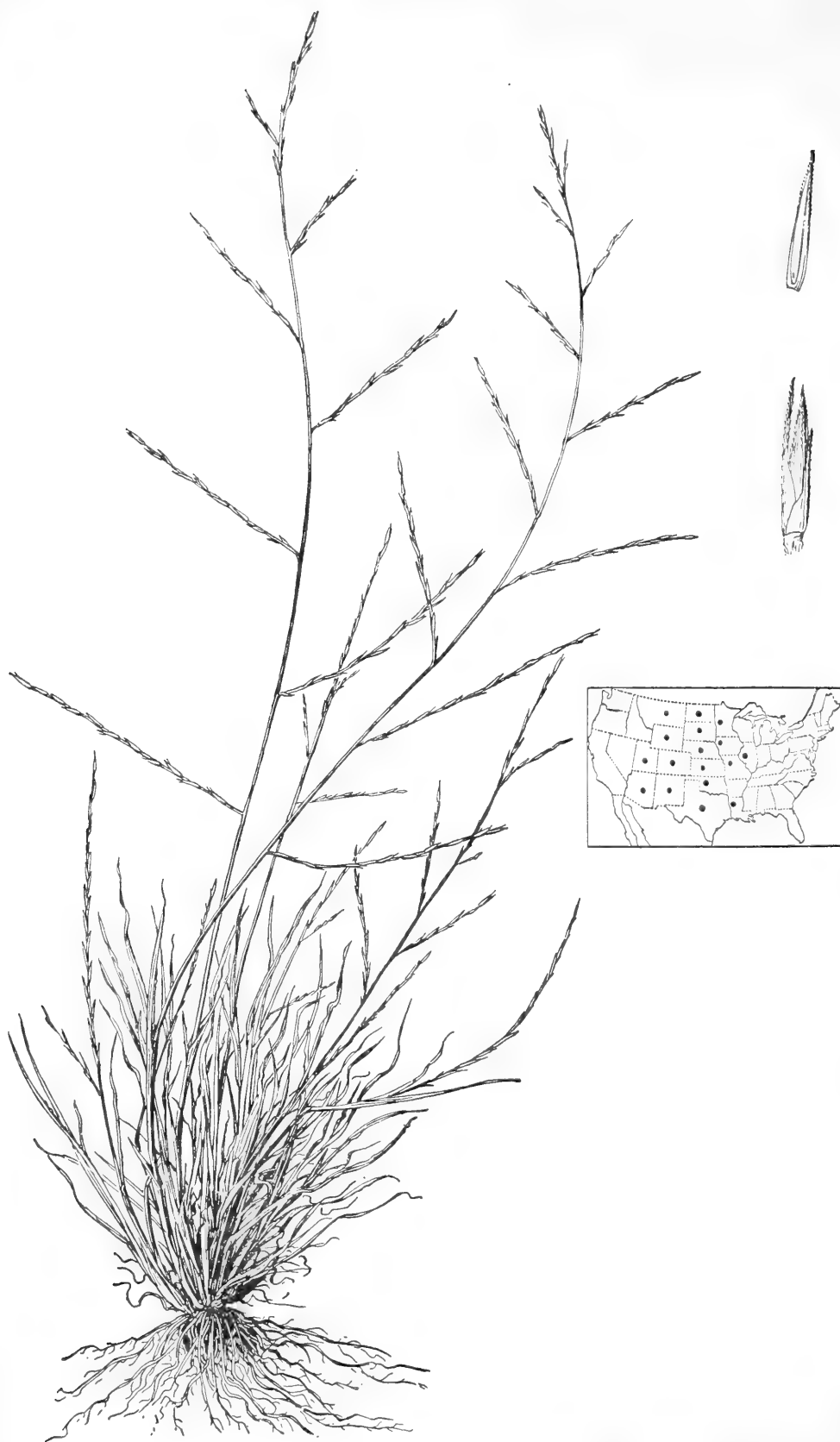


FIGURE 739.—*Schedonnardus paniculatus*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Hall 797, Tex.)



FIGURE 740.—*Beckmannia syzigachne*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Hitchcock 4668, Alaska.)

tufted perennial, with stiff, slender, divergent spikes rather remote along a common axis. Type species, *Schedonnardus texanus* Steud. (*S. paniculatus*). Name from Greek *schedon*, near, and *Nardus*, a genus of grasses (Steudel places *Schedonnardus* next to *Nardus* in his classification).

1. Schedonnardus paniculatus (Nutt.) Trel. TUMBLEGRASS. (Fig. 739.) Culms 20 to 40 cm. tall; leaves crowded at the base; blades flat, mostly 2 to 5 cm. long, about 1 mm. wide, wavy; spikes 2 to 10 cm. long; spikelets narrow, acuminate, about 4 mm. long. The axis of the inflorescence elongates after flowering, becoming 30 to 60 cm. long, curved in a loose spiral; the whole breaks away at maturity and rolls before the wind as a tumbleweed. ☐ —Prairies and plains, Illinois to Saskatchewan and Montana, south to Louisiana and Arizona; Argentina. This species forms an inconsiderable part of the forage on the Great Plains.

106. BECKMANNIA Host
SLOUGHGRASS

Spikelets 1- or 2-flowered, laterally compressed, subcircular, nearly sessile and closely imbricate, in 2 rows along one side of a slender continuous rachis, disarticulating below the

glumes, falling entire; glumes equal, inflated, obovate, 3-nerved, rounded above but the apex apiculate; lemma narrow, 5-nerved, acuminate, about as long as the glumes; palea nearly as long as the lemma. Erect, rather stout annuals with flat blades and numerous short appressed or ascending spikes in a narrow more or less interrupted panicle. Type species, *Beckmannia erucaeformis* (L.) Host, to which our species was formerly referred. Named for Johann Beckmann.

1. Beckmannia syzigachne (Steud.) Fernald. AMERICAN SLOUGHGRASS. (Fig. 740.) Light green; culms 30 to 100 cm. tall; panicle 10 to 25 cm. long, the erect branches 1 to 5 cm. long; spikes crowded, 1 to 2 cm. long; spikelets 1-flowered, 3 mm. long; glumes transversely wrinkled and with a deep keel, the acuminate apex of the lemma protruding. ☉ —Marshes and ditches, Manitoba to Alaska; New York and Ohio to the Pacific coast, south to Kansas and New Mexico; Asia. The European *B. erucaeformis* (L.) Host has 2-flowered spikelets. Our species is palatable to stock, sometimes sufficiently abundant locally to be an important forage grass, and is frequently cut for hay.

107. SPARTINA Schreb. CORDGRASS

Spikelets 1-flowered, much flattened laterally, sessile and usually closely imbricate on one side of a continuous rachis, disarticulating below the glumes, the rachilla not produced beyond the floret; glumes keeled, 1-nerved, or the second with a second nerve on one side, acute or short-awned, the first shorter, the second often exceeding the lemma; lemma firm, keeled, the lateral nerves obscure, narrowed to a rather obtuse point; palea 2-nerved, keeled and flattened, the keel between or at one side of the nerves. Erect, often stout tall perennials, with usually extensively creeping, firm, scaly rhizomes (wanting in *Spartina spartinae*, *S. bakeri*, and sometimes in *S. caespitosa*), long tough blades, and 2 to many appressed or sometimes spreading spikes racemose on the main axis, the slender tips of the rachises naked, often prolonged. Type species, *Spartina schreberi* Gmel. Name from Greek *spartine*, a cord made from *spartes* (*Spartium junceum*), probably applied to *Spartina* because of the tough leaves.

The species with rhizomes often form extensive colonies to the exclusion of other plants. They are important soil binders and soil builders in coastal and interior marshes. A European species, *S. townsendi* H. and J. Groves, has

in recent years assumed much importance, especially in southern England, the Netherlands, and northern France, as a soil builder along the coast where it is reclaiming extensive areas of marsh land. The marsh hay of the Atlantic coast, much used for packing and formerly for bedding, often consists largely of *S. patens*.

Blades usually more than 5 mm. wide, flat when fresh, at least at base, the tip involute; plants mostly robust and more than 1 m. tall.

First glume nearly as long as the floret, slender-acuminate, the second with an awn as much as 7 mm. long; spikes somewhat distant, mostly more or less spreading.

1. *S. PECTINATA*.

First glume shorter than the floret, acute, the second acute or mucronate but not slender-awned; spikes approximate, usually appressed.

Blades very scabrous on the margins; glumes strongly hispid-scabrous on the keels.

2. *S. CYNOSUROIDES*.

Blades glabrous throughout or minutely scabrous on the margins; glumes glabrous or usually softly hispidulous or ciliate on the keels.

Inflorescence dense and spikelike, the spikes closely imbricate; the spikelets mostly somewhat curved, giving a slightly twisted effect; blades mostly comparatively short.

3. *S. FOLIOSA*.

Inflorescence less dense, the spikes more slender, less crowded, the spikelets not curved, the inflorescence with no suggestion of a twist.

4. *S. ALTERNIFLORA*.

Blades less than 5 mm. wide (rarely more in *S. gracilis*); involute (sometimes flat in *S. gracilis*); plants mostly slender and less than 1 m. tall (taller in *S. bakeri*).

Inflorescence dense, cylindric; spikes numerous.

5. *S. SPARTINAE*.

Inflorescence not cylindric; spikes not more than 10, usually fewer.

Creeping rhizomes absent (see also *S. caespitosa*); plants in large hard tufts with culms 1.5 to 2 m. tall and long slender blades.

6. *S. BAKERI*.

Creeping rhizomes present (except occasionally in *S. caespitosa*); plants usually less than 1 m. tall.

Second glume 12 to 16 mm. long, aristate.

7. *S. CAESPITOSA*.

Second glume less than 10 mm. long, acute.

Blades usually flat; glumes conspicuously hispid-ciliate on the keels; spikes several, appressed.

8. *S. GRACILIS*.

Blades usually involute; glumes scabrous on the keels; spikes few, ascending to spreading.

9. *S. PATENS*.

1. *Spartina pectinata* Link.

PRAIRIE CORDGRASS. (Fig. 741.) Culms 1 to 2 m. tall, firm or wiry; blades elongate, flat when fresh, soon involute in drying, as much as 1.5 cm. wide, very scabrous on the margins; spikes mostly 10 to 20, sometimes fewer or as many as 30, mostly 4 to 8 cm. long, ascending, sometimes appressed, rarely spreading, on rather slender peduncles; glumes hispid-scabrous on the keel, the first acuminate or short-awned, nearly as long as the floret, the second exceeding the floret, tapering into an awn as much as 7 mm. long; lemma glabrous except the scabrous keel, 7 to 9 mm. long, the apex with 2 rounded teeth; palea usually a little longer than the lemma. 2♂ (*S. michauxiana* Hitchc.)—Fresh-water marshes, Newfoundland and Quebec to eastern Washington and Oregon, south to North Carolina, Arkansas,

Texas, and New Mexico; in the Eastern States extending into brackish marshes along the coast.

2. *Spartina cynosuroides* (L.)

Roth. BIG CORDGRASS. (Fig. 742.) Culms 1 to 3 m. tall, stout, the base sometimes as much as 2 cm. thick; blades flat, 1 to 2.5 cm. wide, very scabrous on the margins; spikes numerous, ascending, approximate, often dark-colored, usually more or less peduncled, mostly 3 to 8 cm. long; spikelets about 12 mm. long; glumes acute, hispid-scabrous on the keel, the first much shorter than the floret, the second longer than the floret, sometimes rather long-acuminate; lemma not toothed at apex; palea a little longer than the lemma. 2♂ (*S. polystachya* (Michx.) Beauv. (*S. cynosuroides* var. *polystachya* Beal) has been differentiated on its strictly maritime habitat, but morphological



FIGURE 741.—*Spartina pectinata*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Worthern, Mass.)

characters are not coordinated with habitat.)—Salt or brackish marshes along the coast, and margins of tidal streams, Massachusetts to Florida and Texas.

3. *Spartina foliösa* Trin. (Fig. 743.)
Culms 30 to 120 cm. tall, stout, as much as 1 cm. thick at base, somewhat spongy, usually rooting at the lower nodes; blades 8 to 12 mm. wide at the flat base, gradually narrowed to a long involute tip, smooth throughout; inflorescence dense, spike-like, about 15 cm. long; spikes numerous, approximate, closely appressed, 3 to

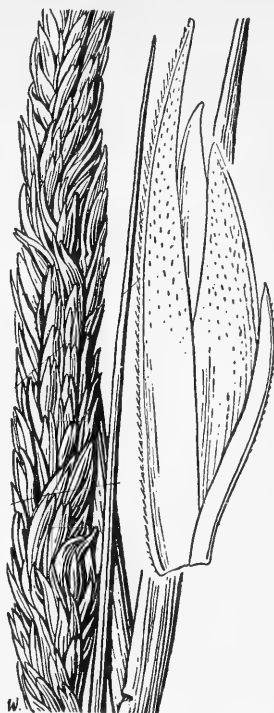


FIGURE 743.—*Spartina foliösa*. Panicle, $\times 1$; spikelet $\times 5$. (Heller 13871, Calif.)

5 cm. long; spikelets very flat, 9 to 12 mm. long, occasionally longer; glumes firm, glabrous or hispid-ciliate on the keel, acute, the first narrow, half to two-thirds as long as the second, smooth, the second sparingly hispidulous and striate-nerved; lemma hispidulous on the sides, mostly smooth on the keel, shorter than the second glume; palea thin, longer than the lemma. 2 (*S. leiantha* Benth.)
—Salt marshes along the coast from San Francisco Bay, Calif., to Baja California.

4. *Spartina alterniflöra* Loisel.
SMOOTH CORDGRASS. (Fig. 744.)
Smooth throughout or the margins of the blades minutely scabrous, 0.5 to 2.5 m. tall; culms soft and spongy or succulent at base, often 1 cm. or more thick; blades flat, tapering to a long involute tip, 0.5 to 1.5 cm. wide; spikes appressed, 5 to 15 cm. long; spikelets somewhat remote, barely overlapping or sometimes more imbricate, mostly 10 to 11 mm. long; glumes glabrous or hispid on the keel, the first acute, narrow, shorter than the lemma, the second obtusish,



FIGURE 742.—*Spartina cynosuroides*. Panicle, $\times 1$; spikelet, $\times 5$. (Boettcher 444, Va.)



FIGURE 744.—*Spartina alterniflora*. Panicle, $\times 1$; spikelet, $\times 5$. (Scribner 155, Maine.)

glabrous spikelets has been differentiated as *S. alterniflora* var. *glabra* (Muhl.) Fernald; that with sparsely pilose spikelets as *S. alterniflora* var. *pilosa* (Merr.) Fernald.

5. *Spartina spartinae* (Trin.) Merr. (Fig. 745.) In large dense tufts without rhizomes; culms stout, 1 to 2 m. tall; blades narrow, firm, strongly involute; spikes short and appressed, closely imbricate, forming a dense cylindric inflorescence 10 to 30 cm. long; spikelets closely imbricate, 6 to 8 mm. long; glumes hispid-ciliate on the keel, the first shorter than the lemma, the second usually a little longer. $\text{\textcircled{2}}$ (*S. junciformis* Engelm. and Gray.)—Marshes, swamps, and

a little longer than the lemma; floret sparingly pilose or glabrous. $\text{\textcircled{2}}$ — Salt marshes along the coast, often growing in the water, Quebec and Newfoundland to Florida and Texas; recently introduced in oyster culture, Pacific County, Wash., and spreading; Atlantic coast of Europe. Through the southern part of the range of the species the spikelets are often more imbricate. The imbricate form with



FIGURE 746.—*Spartina bakeri*. Panicle, $\times 1$; spikelet, $\times 5$. (Type.)

moist prairies near the coast, Florida to Texas and eastern Mexico.

6. *Spartina bakéri* Merr. (Fig. 746.) In large dense tufts without rhizomes; culms stout, 1 to 2 m. tall; blades 4 to 8 mm. wide, involute or occasionally flat; inflorescence 12 to 18 cm. long, the spikes 5 to 12, 3 to 6 cm. long, appressed; spikelets closely ap-

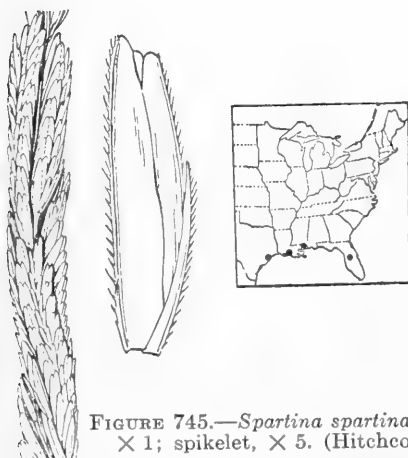


FIGURE 745.—*Spartina spartinae*. Panicle, $\times 1$; spikelet, $\times 5$. (Hitchcock, Tex.)

pressed, 6 to 8 mm. long; glumes scabrous, hispid-ciliate on the keel, the first about half as long as the lemma, the second longer, acuminate. 2l —Sandy soil, South Carolina, Georgia, and Florida.

7. *Spartina caespitosa* A. A. Eaton. (Fig. 747.) Culms 70 to 100 cm. tall, erect, from coarse widely spreading rhizomes or tufted, the rhizomes nearly wanting; blades 10 to 40 cm. long, 3 to 7 mm. wide, flat or becoming involute, scabrous on the upper surface and margins; spikes 2 to 7, 3 to 9 cm. long, finally spreading, rather distant; glumes acuminate, aristate, conspicuously hispid-ciliate



FIGURE 747.—*Spartina caespitosa*. Panicle, $\times 1$; spikelet, $\times 5$. (Type collection.)

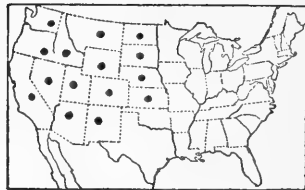


FIGURE 748.—*Spartina gracilis*. Panicle, $\times 1$; spikelet, $\times 5$. (Rydberg 2080, Mont.)

on the keels, the second 12 to 16 mm. long; lemma about 8 mm. long, minutely lobed. 2l —Salt marshes near the coast, New Hampshire to Maryland.

8. *Spartina gracilis* Trin. ALKALI CORDGRASS. (Fig. 748.) Culms 60 to 100 cm. tall; blades flat, becoming involute, 15 to 20 cm. long, very scabrous above, mostly less than 5 mm. wide; spikes 4 to 8, closely appressed, 2 to 4 cm. long; spikelets 6 to 8 mm. long; glumes ciliate on the keel, acute, the first about half as long as the second; lemma nearly as long as second glume, ciliate on the keel; palea as long as lemma, obtuse. 2l —Alkaline meadows and plains, Saskatchewan to British Columbia, south to Kansas and New Mexico,



and through eastern Washington to Arizona.

9. *Spartina patens* (Ait.) Muhl.
SALTMEADOW CORDGRASS. (Fig. 749.) Culms slender, mostly less than 1 m. tall, with long slender rhizomes; blades sometimes flat but mostly involute, less than 3 mm. wide; spikes 2 to several, appressed to somewhat spreading, 2 to 5 cm. long, rather remote on the axis; spikelets 8 to 12 mm. long; first glume about half as long as the floret, the second longer than the lemma; lemma 5 to 7 mm. long, emarginate at apex; palea a little longer than the lemma. ♀ — Salt marshes and sandy meadows along the coast, Quebec to Florida and Texas, and in saline marshes inland, New York and Michigan. *SPARTINA PATENS* var. *MONÓGYNA* (M. A. Curtis) Fernald. Often taller and coarser, commonly with 4 to 8 spikes, the spikelets slightly smaller and more closely imbricate. Intermediate specimens rather frequent. ♀ (*S. juncea* Willd., *S. patens* var. *juncea* Hitchc.)—Along the coast, New Jersey to Texas.

FIGURE 749.—*Spartina patens*. Panicle, $\times 1$; spikelet, $\times 5$. (Killip 6359, Md.)

108. CTÉNIUM Panzer

(*Campulosus* Desv.)

Spikelets several-flowered but with only 1 perfect floret, sessile and pectinately arranged on one side of a continuous rachis, the rachilla disarticulating above the glumes; first glume small, hyaline, 1-nerved, the second about as long as the lemmas, firm, 3- to 4-nerved, bearing on the back a strong divergent awn; lemmas rather papery, 3-nerved, with long hairs on the lateral nerves and a short straight or curved awn on the back just below the apex, the first and second lemmas empty, the third enclosing a perfect flower, the upper 1 to 3 empty and successively smaller. Erect, slender, rather tall perennials, with usually solitary, often curved spikes. Type species, *Ctenium carolinianum* Panzer. (*C. aromaticum*). Name from Greek *ktenion*, a little comb, alluding to the pectinate arrangement of the spikelets.

Plants forming dense tussocks; second glume with a row of prominent glands on each side of the midnerve; awn stout, at maturity horizontal or nearly so; ligule about 1 mm. long.

1. *C. AROMATICUM*.

Plants with slender scaly rhizomes; second glume glandless or with obscure glands; awn rather slender, not horizontally spreading; ligule 2 to 3 mm. long.... 2. *C. FLORIDANUM*.



FIGURE 750.—*Ctenium aromaticum*. Plant, $\times \frac{1}{2}$; spikelet and fertile floret, $\times 5$. (McCarthy, N. C.)



FIGURE 751.—*Ctenium floridanum*. Plant, $\times 1$; glumes and florets, $\times 5$. (Combs 702a, Fla.)

1. *Ctenium aromaticum* (Walt.) Wood. TOOTHACHE GRASS. (Fig. 750.) Culms 1 to 1.5 m. tall, the old sheaths persistent and fibrillose at base; ligule about 1 mm. long; blades flat or involute, stiff; spike 5 to 15 cm. long; spikelets 5 to 7 mm. long. $\text{\textcircled{2}}$ (*Ctenium carolinianum* Panzer.)—Wet pine barrens, Coastal Plain, Virginia to Florida and Louisiana. The roots spicy when freshly dug. Furnishes fair cattle forage in moist pine barrens of Florida.

2. *Ctenium floridanum* (Hitchc.) Hitchc. (Fig. 751.) Differs from *C. aromaticum* in having creeping scaly rhizomes, ligule 2 to 3 mm. long, second glumes with longer, more slender awns and without glands or with only obscure ones. $\text{\textcircled{2}}$ (Erroneously referred by American authors to *Campulosus chapadensis* Trin.)—Moist pine barrens, Florida.

109. GYMNOPOGON Beauv.

Spikelets 1- or rarely 2- or 3-flowered, nearly sessile, appressed and usually remote in 2 rows along one side of a slender continuous rachis, the rachilla disarticulating above the glumes and prolonged behind the 1 or more fertile florets as a slender stipe, bearing a rudiment of a floret, this sometimes with 1 or 2 slender awns; glumes narrow, acuminate, 1-nerved, usually longer than the floret; lemmas narrow, 3-nerved, the lateral nerves near the margin, the apex minutely bifid, bearing between the teeth a slender awn, rarely awnless. Perennials or rarely annuals (ours perennial), with short, stiff, flat blades, often folded in drying, numerous long slender divergent or reflexed spikes, approximate on a slender stiff axis. Type species, *Gymnopogon racemosus* Beauv. (*G. ambiguus*). Name from Greek *gymnos*, naked, and *pogon*, beard, alluding to the naked prolongation of the rachilla.

Awn 4 to 6 mm. long, longer than the lemma..... 1. *G. AMBIGUUS*.
Awn 1 to 3 mm. long, usually shorter than the lemma.

Spikelets 1-flowered; spikes floriferous only in the upper half..... 2. *G. BREVIFOLIUS*.
Spikelets 2- to 3-flowered; spikes floriferous to the base.

Spikes stiffly ascending, usually more than 20; glumes widely spreading even on young spikelets..... 3. *G. CHAPMANIANUS*.

Spikes spreading or reflexed, usually fewer than 15; glumes not spreading, even in mature spikelets..... 4. *G. FLORIDANUS*.

1. *Gymnopogon ambiguus* (Michx.) B. S. P. (Fig. 752.) Culms 30 to 60 cm. tall in small clumps with short scaly rhizomes, suberect to spreading, rigid, sparingly branching; leaves

numerous, approximate with overlapping sheaths, or the lower rather distant; blades spreading, 5 to 15 mm., mostly about 10 mm. wide, the base



FIGURE 752.—*Gymnopogon ambiguus*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Tracy 8292, Tex.).

rounded-truncate; spikes 10 to 20 cm. long, floriferous from base, the lower spikelets often remote; glumes 4 to 6 mm. long; lemma with an awn 4 to 6 mm. long, the rudiment bearing a

ground, Coastal Plain, New Jersey to Florida and Louisiana.

3. *Gymnopogon chapmanianus* Hitchc. (Fig. 754.) Culms 30 to 40 cm. tall, in small tufts, ascending,



FIGURE 753.—*Gymnopogon brevifolius*. Plant, $\times 1$; floret, $\times 5$. (Chase 3669, Va.)

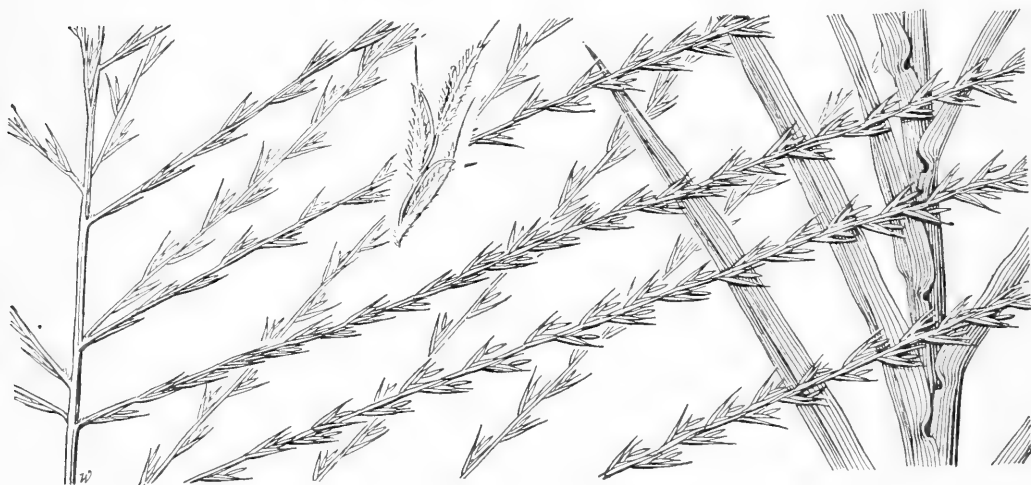


FIGURE 754.—*Gymnopogon chapmanianus*. Plant, $\times 1$; florets, $\times 5$. (Tracy 7102, Fla.)

delicate shorter awn. 2l —Dry pinelands, Coastal Plain, New Jersey to Florida and Texas; dry woods, Ohio to Kansas and south.

2. *Gymnopogon brevifolius* Trin. (Fig. 753.) Differing from *G. ambiguus* in the longer, more slender, somewhat straggling culms, narrower, less crowded blades, and in the subcapillary spikes, floriferous only on the upper half or third; lemma awnless or with a minute awn. 2l —Dry

sparingly branching from lower nodes, rigid; leaves approximate toward the base, the blades 5 to 6 cm. long, about 5 mm. wide, sharp-pointed, often subinvolute in drying; spikes ascending to spreading (not reflexed), floriferous from base, spikelets not remote, 2- or 3-flowered, the florets somewhat spreading; lemmas pubescent, with a minute awn or awnless; palea very narrow, arched. 2l —Sandy pine-lands, Florida.

4. *Gymnopogon floridanus* Swallen. (Fig. 755.) Plants in small tufts, commonly purple below; culms 15 to 45 cm. tall; sheaths glabrous, overlapping, and crowded toward the base, minutely hairy in the throat, the uppermost elongate; blades firm, mostly about 3 cm. long, 2 to 4 mm. wide, sometimes to 6 cm. long and 6 mm. wide, flat, stiffly spreading; spikes 5 to 20, very slender, 10 to 15 cm. long, spreading or reflexed, spikelet-bearing to the base or nearly so; spikelets 2- or 3-flowered, 3 to 5 mm. long; glumes about equal, acuminate, as long as the florets, not spreading; lemma 2 to 2.2 mm. long. ♀ —Sandy prairies and pine barrens, peninsular Florida.



FIGURE 755.—*Gymnopogon floridanus*. Panicle, $\times 1$; florets, $\times 5$. (Type.)

110. *CHLORIS* Swartz. FINGERGRASS

Spikelets with 1 perfect floret, sessile, in 2 rows along one side of a continuous rachis, the rachilla disarticulating above the glumes, produced beyond the perfect floret and bearing 1 to several reduced florets consisting of empty lemmas (a few species occasionally with a second fertile floret), these often truncate, and, if more than 1, the smaller ones usually enclosed in the lower, forming a somewhat club-shaped rudiment; glumes somewhat unequal, the first shorter, narrow, acute; lemma keeled, usually broad, 1- to 5-nerved, often villous on the callus and villous or long-ciliate on the keel or marginal nerves, awned from between the short teeth of a bifid apex, the awn slender or sometimes reduced to a mucro, the sterile lemmas awned or awnless. Tufted perennials or sometimes annuals with flat or folded scabrous blades and 2 to several, sometimes showy and feathery, spikes aggregate at the summit of the culms. Type species, *Chloris cruciata* (L.) Swartz. Named for Greek *Chloris*, the goddess of flowers.

Several species are found on the plains of Texas, where they form part of the forage for grazing animals. *C. virgata* is a rather common annual weed in the Southwest, especially in alfalfa fields. It may be locally abundant and then furnishes considerable forage. *C. gayana*, Rhodes grass, is cultivated in the irrigated regions of the Southwest, where it is valuable as a meadow grass. It is also used in the Hawaiian Islands on some ranches in the drier regions. In a few species 2 or 3 internodes of the culm may be greatly reduced, bringing the nodes and sheaths close together.

Lemmas firm, dark brown, awnless or mucronate. Perennials with strongly compressed

culms and sheaths, and firm flat or folded blades abruptly rounded at the tip.

Lemmas distinctly awned (awn very short in *C. cucullata*), pale or fuscous.

SECTION 1. EUSTACHYS.

SECTION 2. EUCHLORIS.

Section 1. Eustachys

- Spikes numerous, usually more than 10..... 1. *C. GLAUCA*.
 Spikes usually not more than 6.
 Spikelets 2 mm. long; lemmas dark..... 2. *C. PETRAEA*.
 Spikelets 3 mm. long; lemmas pale to golden brown until maturity.
 Spikes 2, sometimes 1 or 3..... 3. *C. FLORIDANA*.
 Spikes 4 to 6..... 4. *C. NEGLECTA*.

Section 2. Euchloris

- Rudiment narrow, oblong, acute, often inconspicuous. (Second rudiment truncate in *C. gayana*).
 Plant producing long, stout stolons..... 5. *C. GAYANA*.
 Plant not stoloniferous (occasionally with short stolons in *C. andropogonoides*).
 Fertile lemma about 2.5 mm. long; plants mostly less than 50 cm. tall; spikes mostly less than 10 cm. long..... 7. *C. ANDROPOGONOIDES*.
 Fertile lemma 4 to 7 mm. long; plants 40 to 100 cm. or more tall; spikes mostly more than 10 cm. long.
 Blades folded, abruptly acute or rounded; spikes whorled, naked at base.
 8. *C. TEXENSIS*.
 Blades flat, long-acuminate; spikes racemose on a short axis, solitary or in small fascicles..... 6. *C. CHLORIDEA*.
 Rudiment truncate-broadened at apex, usually conspicuous (rather narrow in *C. virgata*).
 Lemma conspicuously ciliate-villous, the spikes feathery.
 Plants annual. Lemma long-ciliate on the lateral nerves near apex..... 9. *C. VIRGATA*.
 Plants perennial.
 Spikes flexuous, nodding, mostly 10 to 15 cm. long; hairs much exceeding the spikelets..... 10. *C. POLYDACTYLA*.
 Spikes straight or subflexuous, 5 to 7 cm. long; hairs about equaling the spikelets.
 11. *C. CILIATA*.
 Lemma minutely ciliate on the nerves or glabrous, the spikes not feathery.
 Awn of fertile lemma usually 3 to 8 mm. long; spikes mostly 7 to 12 cm. long, the spikelets not closely crowded..... 12. *C. VERTICILLATA*.
 Awn of fertile lemma usually less than 3 mm. long; spikes usually less than 6 cm. long, the spikelets crowded.
 Awns about 1 mm. long; rudiment prominent, inflated, broadly triangular-truncate, about 1.5 mm. wide as folded at summit..... 15. *C. CUCULLATA*.
 Awns 2 to 3 mm. long; rudiment not inflated, not more than 1 mm. wide as folded at summit.
 Rudiment oblong-cuneate, about 0.6 mm. wide as folded at summit.
 13. *C. SUBDOLICHOSTACHYA*.
 Rudiment triangular-truncate, about 1 mm. wide as folded at summit.
 14. *C. LATISQUAMEA*.

SECTION 1. EÚSTACHYS (Desv.) Reichenb.

Lemmas firm, brown to blackish, awnless or mucronate only; glumes scabrous, the second mucronate from a notched or truncate summit. Perennials.

1. *Chloris glauca* (Chapm.) Wood. (Fig. 756.) Glaucous; culms erect, compressed, stout, 70 to 150 cm. tall; basal sheaths several, broad, compressed, keeled, overlapping and equitant, those of the succeeding 1 or 2 distant nodes similar, 2 to 4 leaves aggregate; blades flat or folded, as

much as 1 cm. wide, the tip abruptly rounded; spikes several to many (as many as 20), ascending, 7 to 12 cm. long; spikelets about 2 mm. long; lemma glabrous or scaberulous on the nerves. 2 (*Eustachys glauca* Chapm.)—Brackish marshes, wet prairies, and swamps, North Carolina (Wilmington), Georgia (Baker County), and Florida.

2. *Chloris petraea* Swartz. (Fig. 757.) Often glaucous, sometimes purplish; culms slender, 50 to 100 cm. tall, more or less decumbent and root-



FIGURE 756.—*Chloris glauca*. Plant, $\times 1$; florets, $\times 5$. (Combs and Baker 1143, Fla.)

ing or producing distinct stolons; sheaths compressed, strongly keeled, usually 2 to 4 aggregate below; blades 3 to 8 mm. wide, often short and numerous on the stolons; spikes mostly 4 to 6, 4 to 10 cm. long; spikelets 2 mm. long; lemma mucronate, short-ciliate on the nerves. 2 (Eustachys petraea Desv.)—Strands, sandy fields, and open pine woods, Coastal Plain, North Carolina to Florida and Texas; tropical America.

3. *Chloris floridana* (Chapm.) Wood. (Fig. 758.) Culms slender, 40 to 80 cm. tall; sheaths compressed, crowded at base but not paired or aggregate at succeeding nodes; blades 3 to 7 mm. wide, somewhat narrowed toward the acutish tip; spikes mostly 2, sometimes 1 or 3, 5 to 10 cm. long; spikelets 3 mm. long; second glume with an awn about 1 mm. long; lemma with a slender mucro 0.5 to 1 mm.

long, stiffly ciliate on keel and lateral nerves. 2 (*Eustachys floridana* Chapm.)—Dry sandy woods and open ground, Georgia and Florida.

4. *Chloris neglecta* Nash. (Fig. 759.) Differing from *C. floridana* in having usually taller, stouter culms, the leaves sometimes paired at the lower nodes; spikes 3 to 8, mostly 4 to 6. 2 (*Eustachys neglecta* Nash.)—Open sandy woods and swamps, Florida.

Chloris distichophylla Lag. Culms about 1 m. tall; spikes several (as many as 20), drooping, feathery; lemma ciliate with silky hairs 1 mm. long. 2 —Escaped from cultivation in southern California. A specimen from Bastrop, Tex., is probably also an escape from cultivation; South America.

CHLORIS ARGENTINA (Hack.) Lillo and Parodi. Culms erect, compressed, 30 to 90

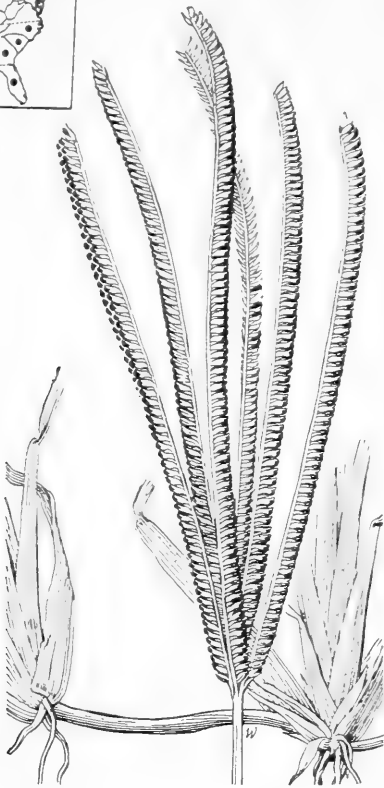


FIGURE 757.—*Chloris petraea*. Plant, $\times 1$; florets, $\times 5$.
(Curtiss, Fla.)



FIGURE 758.—*Chloris floridana*. Panicle, $\times 1$; florets,
 $\times 5$. (Nash 2198, Fla.)

cm. tall; leaves mostly crowded toward the base, the sheaths compressed, keeled, the blades short, 4 to 10 mm. wide; racemes 7 to 12, mostly 5 to 10 cm. long, erect or ascending, crowded, brown, appearing feathery from the cilia on the margins of the lemma; spikelets about 2 mm. long. ♀ —Introduced from Argentina. Roadsides near Tifton, Ga. Probably escaped from cultivation.

CHLORIS CAPÉNSIS (Houtt.) Thell. Stoloniferous perennial; culms 40 to 75 cm. tall; blades obtuse; spikes few to several, finally



FIGURE 759.—*Chloris neglecta*. Panicle, $\times 1$; florets,
 $\times 5$. (Curtiss 3445, Fla.)

arcuate-spreading; spikelets about 2.5 mm. long, the glumes short-awned, the brown lemmas white-ciliate on the keel and margin, awnless. ♀ —Introduced from South Africa. Levy County, Fla. Probably escaped from cultivation.



FIGURE 760.—*Chloris gayana*. Plant, $\times \frac{1}{2}$; florets, $\times 5$. (Hitchcock 13667, Ariz.)

SECTION 2. EUCHLÓRIS Endl.

Lemmas tawny to grayish or fuscous, awned; glumes acute to acuminate. Mostly perennial.

5. *Chloris gayána* Kunth. RHODES GRASS. (Fig. 760.) Culms 1 to 1.5 m. tall with long, stout, leafy stolons, the internodes compressed, tough and wiry; blades 3 to 5 mm. wide, tapering to a fine point; spikes several to numerous, erect or ascending, 5 to 10 cm. long; spikelets crowded, pale-tawny; lemma 3 mm. long, hispid on the margin near the summit, more or less hispidulous below, the awn 1 to 5 mm. long; rudiment commonly of 2 florets, the lower occasionally fertile, rather narrow, the awn usually somewhat shorter than that of the fertile lemma, the upper minute, broad, truncate. 2 —Cultivated for forage in warmer regions, escaped into fields and waste places, North Carolina and from Florida to southern California and in tropical America. Introduced from Africa. A promising meadow grass in irrigated regions.

6. *Chloris chlorídea* (Presl) Hitchc. (Fig. 761.) Culms slender, 60 to 100 cm. tall; blades flat, 3 to 7 mm. wide, long-acuminate; spikes slender, few to several, mostly 8 to 15 cm. long, approximate on an axis 2 to 10 cm. long; spikelets appressed, not crowded; lemma narrow, glabrous, somewhat scaberulous toward the tip, about 6 mm. long, the awn 10 to 12 mm. long; rudiment very narrow, awned. 2 (*C. clandestina* Scribn. and Merr.)—Open ground, Texas (Brownsville), Arizona, Mexico, and Honduras. Large cleistogamous spikelets are borne on slender underground branches, rather rare in herbarium specimens, either infrequent or readily broken off.

7. *Chloris andropogonoídes* Fourn. (Fig. 762.) Culms densely tufted, 20 to 40 cm. tall, the leaves mostly basal; blades about 1 mm. wide as folded; spikes slender, few to several, 5 to 10 cm. long, whorled, divergent, floriferous from base; spikelets scarcely overlapping; lemma minutely pubescent on midnerve and margin or



FIGURE 761.—*Chloris chlorídea*. Terminal and subterranean inflorescences, $\times 1$; florets, $\times 5$. (Silveus 379, Tex.)



FIGURE 762.—*Chloris andropogonoides*. Panicles, $\times 1$; florets, $\times 5$. (Chase 6067, Tex.)

glabrous, 2 to 3 mm., usually about 2.5 mm. long, awned below the tip, the awn about 5 mm. long; rudiment narrow, the awn usually shorter than that of the lemma. 2 (C. tenuispica Nash.)—Plains, Texas and northern Mexico.

8. *Chloris texensis* Nash. (Fig. 763.) Culms taller and stouter than in *C. andropogonoides*; blades 2 to 3

mm. wide as folded; spikes slender, mostly about 15 to 18 cm. long, naked for 1 to 4 cm. at the base; spikelets appressed, not crowded; lemma about 4 mm. long, naked on the midnerve, minutely pilose on margin toward summit; awn about 1 cm. long. 2 (C. nealleyi Nash.)—Plains, Texas, rare.



FIGURE 763.—*Chloris texensis*. Panicle, $\times 1$; florets, $\times 5$. (Thurrow 8, Tex.)



FIGURE 764.—*Chloris virgata*. Plant, $\times \frac{1}{2}$; glumes and florets, $\times 5$. (Tracy 8173, Tex.)

***Chloris prieurii* Kunth.** Annual; culms 30 to 60 cm. tall, often rooting at the lower nodes; blades 2 to 6 mm. wide, the upper sheath inflated; spikes 2 to 8, erect, 5 to 8 cm. long;

fertile lemma 2.5 mm. long, narrow, ciliate near the summit, with a delicate awn 7 to 10 mm. long; rudiment narrow, of 3 or 4 reduced sterile lemmas each with a long

delicate erect awn. ☉ —Ballast, Wilmington, N. C., and Mobile, Ala.; West Africa.

9. *Chloris virgata* Swartz. FEATHER FINGERGRASS. (Fig. 764.) Annual; culms ascending to spreading, 40 to 60 or even 100 cm. tall; upper sheaths often inflated; blades flat, 2 to 6 mm. wide; spikes several, 2 to 8 cm. long, erect, whitish or tawny, feathery or

in a few localities in the Eastern States, Ohio, Indiana, and North Carolina to Florida; Louisiana and Missouri; tropical America.

10. *Chloris polydactyla* (L.) Swartz. (Fig. 765.) Culms erect, wiry, 50 to 100 cm. tall; blades as much as 1 cm. wide; spikes several to many, mostly 10 to 15 cm. long, flexuous, nodding, tawny, feathery;

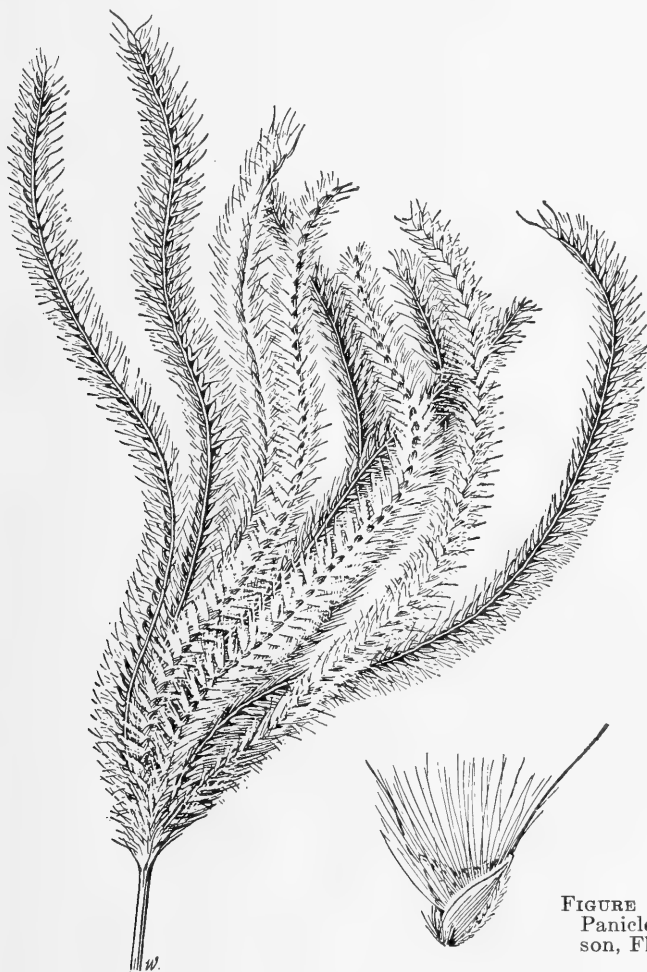


FIGURE 766.—*Chloris ciliata*. Panicle, $\times 1$; florets, $\times 5$. (Tracy 8886, Tex.)

FIGURE 765.—*Chloris polydactyla*. Panicle, $\times 1$; florets, $\times 5$. (Simpson, Fla.)

silky; spikelets crowded; lemma 3 mm. long, somewhat humpbacked on the keel, long-ciliate on the margins near the apex, the slender awn 5 to 10 mm. long; rudiment narrowly cuneate, truncate, the awn as long as that of the lemma. ☉ (*C. elegans* H. B. K.)—Open ground, a common weed in fields and waste places; Nebraska to Texas and southern California; Maine and Massachusetts, on wool waste; introduced

spikelets crowded; lemma ciliate with long silky hairs; rudiment oblong, obliquely truncate, awns of lemma and rudiment about 3 mm. long. 2l —Open sandy soil, southern Florida; West Indies to Paraguay.

11. *Chloris ciliata* Swartz. (Fig. 766.) Perennial; culms erect or ascending, 50 to 100 cm. tall; leaves not aggregate toward the base, sheaths not much compressed; blades 3 to 5 mm. wide, sharply acuminate;

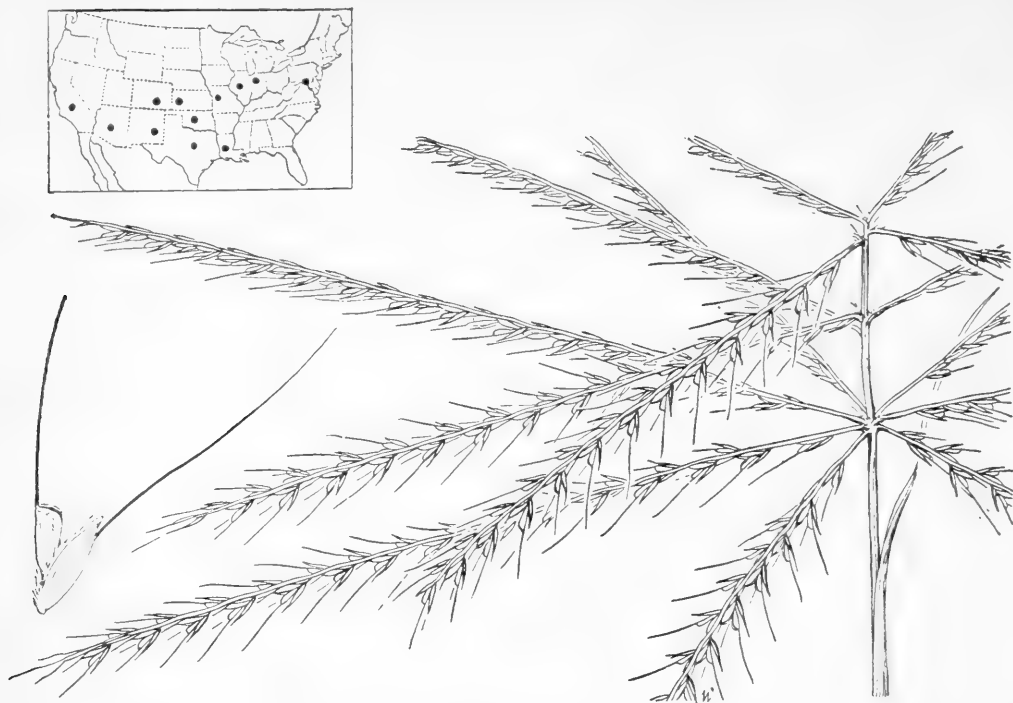


FIGURE 767.—*Chloris verticillata*. Panicle, $\times 1$; florets, $\times 5$. (Ball 1112, Tex.)

spikes mostly 3 to 6, usually 5 to 7 cm. long, digitate or nearly so, erect to spreading, somewhat flexuous; spikelets crowded, about 3 mm. long; lemma densely long-villous on the keel and the middle of the margin, the awn shorter than the body; rudiment triangular-cuneate, about 2 mm. wide. $\text{\textcircled{2}}$ (*C. nashii* Heller.)—Open grassland, southern Texas and Mexico.

12. *Chloris verticillata* Nutt. WIND-MILL GRASS. (Fig. 767.) Culms tufted, 10 to 40 cm. tall, erect or decumbent at base, sometimes rooting at the lower nodes; leaves crowded at base, 2 to 4, sometimes aggregate at lower nodes; sheaths compressed, blades 1 to 3 mm. wide, obtuse; spikes slender, 7 to 10 or even 15 cm. long, in 1 to 3 whorls, finally widely spreading; spikelets about 3 mm. long; fertile lemma pubescent on the nerves, the awn mostly 5 to 8 mm. long; rudiment (rarely fertile), cuneate-oblong, rather turgid, about 0.7 mm. wide as folded, truncate, the awn about 5 mm. long. $\text{\textcircled{2}}$ —Plains, Missouri to Colorado, south to Louisiana and Arizona; introduced in Maryland,

Indiana, Illinois, and California (Berkeley). The inflorescence at maturity breaks away and rolls before the wind as a tumbleweed.

13. *Chloris subdolichostachya* C. Muell. (Fig. 768.) Similar to *C. verticillata*, but not more than 20 cm. tall, spikes mostly less than 6 cm. long, these more condensed and usually in one whorl or irregularly approximate; lemma 2 to 2.5 mm. long, the awns mostly less than 3 mm. long; rudiment oblong-cuneate, about 0.6 mm. wide as folded. $\text{\textcircled{2}}$ (*C. brevispica* Nash.)—Plains, Kansas, Texas.

14. *Chloris latisquamea* Nash. (Fig. 769.) Culms densely tufted, 20 to 60 cm. tall, very leafy at base, sometimes rooting at the lower nodes; sheaths compressed, 2 to 4 often aggregate at the lower node; blades 2 to 4 mm. wide; spikes mostly 8 to 12, relatively broad, 4 to 10 cm. long, in 1 or 2 whorls, spreading; spikelets rather crowded, pale, turning fuscous at maturity; lemma about 2.5 mm. long, pubescent on the nerves, the awn 2 to 2.5 mm. long; rudiment (rarely fertile) triangular cuneate,



FIGURE 768.—*Chloris subdolichostachya*. Panicle, $\times 1$; florets, $\times 5$. (Heller 1579, Tex.)

FIGURE 769.—*Chloris latisquamea*. Panicle, $\times 1$; florets, $\times 5$. (Mearns 1233, Ariz.)

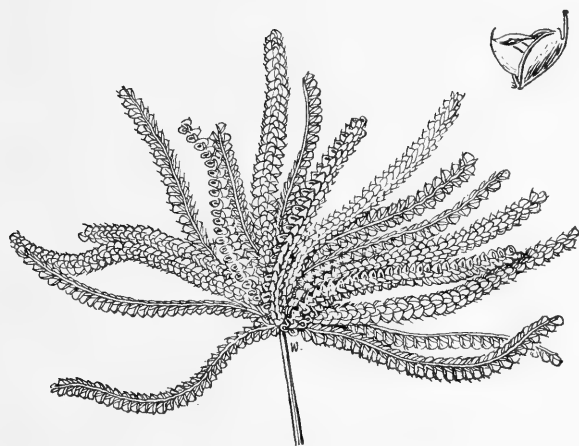


FIGURE 770.—*Chloris cucullata*. Panicle, $\times 1$; florets, $\times 5$. (Hitchcock 5497, Tex.)

about 1 mm. wide at summit as folded. 2 —Plains, Texas, Arizona. Resembling *C. cucullata*, but commonly taller with longer spikes, the rudiment longer than broad, less inflated, the awns 2 to 2.5 mm. long.

15. *Chloris cucullata* Bisch. (Fig. 770.) Culms tufted, erect or somewhat spreading at base, 20 to 50 cm.

tall; sheaths compressed; blades 1 to 2 mm. wide as folded, the uppermost often much reduced; spikes numerous, 2 to 5 cm. long, digitate, radiating, flexuous or curled; spikelets crowded, stramineous, turning fuscous at maturity, triangular, about 2 mm. long and about as broad; rudiment prominent, compressed-cup-

shaped, about 1.5 mm. wide, the awns of lemma and rudiment about 1 mm. long. ♀ —Plains and sandy barrens, Texas, Oklahoma, and New Mexico.

***Chloris radiáta* (L.) Swartz.** Weedy branching annual; culms 30 to 40 cm. long, decumbent; blades thin, 2 to 3 mm. wide; spikes slender, several to many, 3 to 8 cm. long; lemma narrow, 2.5 mm. long, the narrow rudiment mostly included in its margins; awns of lemma and rudiment very slender, 5 to 10 mm. long. ☉ —Ballast, near Portland, Oreg.; tropical America.

***Chloris submútica* H. B. K.** Sparingly stoloniferous, culms 30 to 65 cm. tall; sheaths compressed-keeled; spikes 5 to 14, 3 to 8 cm. long, somewhat whorled on a short axis, spreading; spikelets 3 to 3.5 mm. long; fertile floret 3 to 3.5 mm. long, the callus bearded, the lemma obtuse, pilose toward the summit, awnless or mucronate; rudiment truncate, awnless ♀ —Dona Ana County, N.

Mex., probably escaped from cultivation. Mexico.

***Chloris Bérroi* Arech.** Densely tufted, culms 40 to 65 cm. tall, leafy; spikes and spikelets much like those of *C. ciliata*, but the 2 to 5 spikes closely and permanently appressed, the rachises adhering, forming a subcylindrical silky inflorescence. ♀ —Occasionally cultivated, Oklahoma and Texas, introduced from Uruguay.

***Chloris ventricósa* R. Br.** Culms straggling and rooting at the nodes, 40 to 90 cm. long; spikes 3 to 5, 7 to 10 cm. long, flexuous, spreading or drooping; spikelets about 5 mm. long; fertile lemma subindurate, brown, truncate, glabrous except for the pubescent callus, awn 4 to 5 mm. long, that of the truncate rudiment 1 to 2 mm. long. ♀ —Occasionally cultivated, Virginia and Oklahoma; introduced from Australia.

***Chloris cantérai* Arech.** Perennial, resembling *C. polydactyla*, but blades only 2 to 5 mm. wide; spikes 2 to 4; spikelets slightly larger. ♀ —Spontaneous along roadsides and in uncultivated ground, Bexar County, Texas, introduced from Paraguay.

***Chloris truncáta* R. Br.** Stoloniferous perennial; culms erect, 10 to 30 cm. tall; spikes 6 to 10, 7 to 15 cm. long, horizontal or reflexed; spikelets 3 mm. long, the awns 6 to 12 mm. long. ♀ —Occasionally cultivated for ornament under the name star-grass. Australia.

111. TRICHLÓRIS Fourn.

Spikelets 2- to 5-flowered, nearly sessile, in 2 rows along one side of a continuous slender rachis, the rachilla disarticulating above the glumes and prolonged behind the uppermost perfect floret, bearing a reduced, usually awned floret; glumes unequal, acuminate, or short-awned, the body shorter than the lower lemma; lemmas narrow, 3-nerved, the midnerve and usually the lateral nerves extending into slender awns. Erect, slender, tufted perennials, with flat scabrous blades and numerous erect or ascending spikes, aggregate but scarcely digitate at the summit of the culms. Type species, *Trichloris pluriflora*. Name from Latin *tri*, three, and *Chloris*, a genus of grasses, the lemmas being 3-awned.

Spikelets 2-flowered, both lemmas with 3 long awns..... 1. *T. CRINITA*.
Spikelets 3- to 5-flowered, the lateral awns of the lemmas more or less reduced, sometimes
obsolete..... 2. *T. PLURIFLORA*.

1. *Trichloris crinita* (Lag.) Parodi. (Fig. 771, A.) Culms 40 to 100 cm. tall; blades 2 to 4 mm. wide; inflorescence dense, feathery, the spikes 5 to 10 cm. long; spikelets crowded; fertile lemma about 3 mm. long, the second lemma much reduced, both with delicate awns about 1 cm. long. ♀ (*T. mendocina* (Phil.) Kurtz.)—Plains, canyons, and rocky hills,

western Texas to Arizona and northern Mexico; southern South America. Rarely cultivated for ornament (as *T. blanchardiana* Fourn.).

2. *Trichloris pluriflóra* Fourn. (Fig. 771, B.) Culms 50 to 100 cm. tall; blades 5 to 10 mm. wide; inflorescence looser and less feathery than in *T. crinita*; spikes 7 to 15 cm. long; fertile



FIGURE 771.—A, *Trichloris crinita*. Plant, $\times \frac{1}{2}$; glumes and florets, $\times 5$. (Nealley, Tex.) B, *T. pluriflora*. Glumes and florets, $\times 5$. (Griffiths 6484, Tex.)

lemma about 4 mm. long, the others obsolete. 2 —Plains and dry successively shorter, the middle awns woods, southern Texas and Mexico; of all 5 to 15 mm. long, somewhat southern South America. spreading, the lateral awns short or

112. BOUTELOUA Lag. GRAMA

Spikelets 1-flowered, with the rudiments of 1 or more florets above, sessile, in 2 rows along one side of the rachis; glumes 1-nerved, acuminate or awn-tipped, the first shorter and narrower; lemma as long as the second glume or a little longer, 3-nerved, the nerves extending into short awns or mucros, the internerves usually extending into lobes or teeth; palea sometimes 2-awned; rudiment various, usually 3-awned, the awns usually longer than those of the fertile lemma, a second rudimentary floret sometimes present. Perennial or sometimes annual, low or rather tall grasses, with 2 to several or many spikes racemose on a common axis, or sometimes solitary, the spikelets few to many in each spike, rarely solitary, pectinate or more loosely arranged and appressed, the rachis of the spike usually naked at the tip. The sterile florets forming the rudiment are variable in all the species and commonly in individual specimens. The general pattern of rudiment is fairly constant for each species, the variability being in the reduction or increase in number and size of the sterile florets, the reduction from 3 awns to 1, and in the amount of pubescence. Type species, *Bouteloua racemosa* Lag. (*B. curtipendula*). Named for the brothers, Boutelou, Claudio, and Esteban. The genus was originally published as *Botelua*.

The many species are among our most valuable forage grasses, forming an important part of the grazing on the western ranges. *B. gracilis*, blue grama, and *B. hirsuta*, hairy grama, are prominent in "short grass" regions of the Great Plains; *B. eriopoda*, black grama, and *B. rothrockii*, Rothrock grama, are prominent in Arizona. Two annuals, *B. barbata* and *B. parryi*, form a part of the sixweeks grasses of the Southwest; *B. curtipendula* is widely distributed and is much used for grazing and for hay; *B. trifida* is important from Texas to Arizona.

Spikelets not pectinately arranged (except in *B. chondrosioides*), the spikes falling entire at maturity..... SECTION 1. ATHEROPOGON.
Spikelets pectinately arranged, the spikes persistent, the florets falling from the persistent glumes..... SECTION 2. CHONDROSIUM.

Section 1. Atheropogon

- Plants annual..... 1. B. ARISTIDOIDES.
- Plants perennial.
 - Spikes usually 20 to 50; awns short, inconspicuous.
 - Spikes of 1 or 2 spikelets; culms very slender..... 2. B. UNIFLORA.
 - Spikes of few to several spikelets; culms mostly stouter..... 3. B. CURTIPENDULA.
 - Spikes fewer; awns conspicuous.
 - Glumes pubescent.
 - Spikes rhomboid-oblong, as much as 2 cm. long, the spikelets somewhat pectinately arranged..... 6. B. CHONDROSIOIDES.
 - Spikes cuneate-triangular, about 1 cm. long (including the awns), the spikelets appressed, not pectinately arranged.
 - Culms 20 to 30 cm. tall; leaves crowded at base; spikes mostly 6 to 8. 4. B. RIGIDISETA.
 - Culms mostly 30 to 50 cm. tall, leafy throughout; spikes mostly more than 10. 5. B. ELUDENS.
 - Glumes glabrous or scabrous, not pubescent.
 - Base of plants hard, rhizomatous; culms mostly simple; spikes 2 to 3 cm. long. 7. B. RADICOSA.
 - Base of plants not rhizomatous; culms branching; spikes usually about 1.5 cm., sometimes 2 cm., long..... 8. B. FILIFORMIS.

Section 2. *Chondrosium*

Plants annual (see also *B. rothrockii*); densely tufted, spreading.

Spike 1..... 9. *B. SIMPLEX*.

Spikes 2 or more.

Rachis papillose-pilose..... 11. *B. PARRYI*.

Rachis not pilose..... 10. *B. BARBATA*.

Plants perennial.

Plants decumbent or stoloniferous; culms white-lanate..... 17. *B. ERIOPODA*.

Plants erect or nearly so; culms tufted, not lanate.

Spikes normally 2, sometimes 1 or 3.

Rachis prolonged beyond the spikelets as a naked point; glumes tuberculate.

Culms retrorsely hirsute below the nodes..... 13. *B. GLANDULOSA*.

Culms glabrous..... 14. *B. HIRSUTA*.

Rachis not prolonged; glumes not tuberculate (slightly so in *B. gracilis*).

Culms herbaceous, the base not woody..... 15. *B. GRACILIS*.

Culms woody and perennial at base..... 16. *B. BREVISETA*.

Spikes normally 4 or more (see also *B. gracilis* var. *stricta*).

Culms 25 to 50 cm. tall; awn 1 to 2 mm. long; glumes scabrous; spikes spreading. 12. *B. ROTHROCKII*.

Culms 10 to 20 cm. tall; awn about 5 mm. long; glumes glabrous; spikes usually appressed..... 18. *B. TRIFIDA*.

SECTION 1. *ATHEROPOGON* (Muhl.) Endl.

Spikes deciduous from the main axis; spikelets not pectinately arranged (somewhat so in *B. chondrosioides*). (*Atheropogon* Muhl. based on *A. apludoides* Muhl. (*Bouteloua curtispindula*).)

1. *Bouteloua aristidoides* (H. B. K.) Griseb. NEEDLE GRAMA. (Fig. 772.) Annual, erect or spreading,



FIGURE 772.—*Bouteloua aristidoides*. Panicle, $\times 1$; spikelet, $\times 5$. (Griffiths 7308, Ariz.)



FIGURE 773.—*Bouteloua uniflora*, $\times 7$. (Type.)

branching; culms slender, 10 to 30 cm. tall; blades small and few, in vigorous plants as much as 15 cm. long; spikes mostly 8 to 14 on a slender axis, reflexed, readily falling, the base of the rachis forming a sharp, bearded point; spikelets 2 to 4, narrow, appressed; rudiment of 3 scabrous awns about 5 mm. long, exceeding the fertile floret. ☉ (*Triathera aristidoides* Nash.)—Mesas, deserts, and foothills in open ground, Texas to Nevada, southern California, and northern Mexico; Argentina.



FIGURE 774.—*Bouteloua curtipendula*. Plant, $\times \frac{1}{2}$; spikelet and florets, $\times 5$. (Chase 5403, Colo.)

BOUTELOUA ARISTIDOIDES var. **ARIZÓNICA** Jones. Spikes arcuate, to 2.5 cm. long, with 5 to 10 spikelets. ☉

—Mesas and deserts, southern Arizona and northern Mexico.

2. Bouteloua uniflora Vasey. (Fig.

773.) Resembles slender forms of *B. curtispéndula*, culms slender, wiry, sometimes with slender stolons, the slender blades subinvolute, the spikes 8 to 9 mm. long, with 1 or 2 spikelets, the scabrous rachis mostly longer than the first glume; lemma awnless; rudiment reduced to a single awn appressed to the back of the palea. 2 —Rocky hills and valleys, central and western Texas.

3. *Bouteloua curtispéndula* (Michx.) Torr. SIDE-OATS GRAMA. (Fig. 774.) Perennial, with scaly rhizomes; culms erect, tufted, 50 to 80 cm. tall; blades flat or subinvolute, 3 to 4 mm. wide, scabrous; spikes 35 to 50, 1 to 2 cm. long, purplish, spreading or pendulous and mostly twisted to one side of the slender axis, this 15 to 25 cm. long; spikelets 5 to 8, appressed or ascending, 6 to 10 mm. long; fertile lemma acute, mucronate; rudiment with 3 awns and subacute intermediate lobes, often reduced and inconspicuous. 2 (*Atheropogon curtispéndulus* Fourn.)—Plains, prairies, and rocky hills, Maine and Ontario to Montana, south to Virginia, Alabama, Texas, Arizona, and southern California; South Carolina (introduced); Mexico to Argentina.

4. *Bouteloua rigidiséta* (Steud.) Hitchc. (Fig. 775.) Perennial, tufted, leafy at base; culms erect, 20 to 30 cm. tall; blades narrow, flat or somewhat involute, 1 to 1.5 mm. wide, sparingly papillose-pilose; spikes 6 to 8, triangular-cuneate, spreading, about 1 to 1.2 cm. long including the awns; spikelets mostly 2 to 4, crowded, ascending; glumes pubescent; fertile lemma with 3 spreading awns, the intermediate lobes acute; rudiment with stout spreading awns, much exceeding those of the fertile lemma, the intermediate lobes firm, pointed, a second similar but smaller rudiment commonly developed. 2 (*B. texana* S. Wats.; *Polyodon texanus* Nash.)—Plains and rocky hills, Oklahoma, Texas, and northern Mexico.

5. *Bouteloua elúdens* Griffiths. (Fig. 776.) Perennial, densely tufted,



FIGURE 775.—*Bouteloua rigidiséta*. Panicle, $\times 1$; spikelet, $\times 7$; lemma and florets, $\times 5$. (Griffiths 6370, Tex.)

leafy at base; culms erect, 25 to 60 cm. tall; blades mostly 1 to 1.5 mm. wide; axis slender, flexuous, 6 to 8 cm. long; spikes 10 to 20, triangular, spreading, about 1 cm. long including the awns; spikelets about 5; rachis and glumes densely pubescent; fertile lemma pubescent toward the summit, the apex 3-cleft, the divisions awn-tipped; rudiment with stout pubescent awns about 5 mm. long, the long narrow intermediate lobes glabrous; a second similar but smaller rudiment usually developed. 2 —Rocky hills, southern Arizona and Sonora, Mexico.



FIGURE 776.—*Bouteloua eludens*. Panicle, $\times 1$; spike and spikelet, $\times 5$. (Type.)

6. *Bouteloua chondrosioides* (H. B. K.) Benth. ex S. Wats. (Fig. 777.) Perennial, tufted, leafy at base; culms erect, 20 to 50 cm. tall; blades 2 to 3 mm. wide; axis 4 to 6 cm. long; spikes 4 to 6, rhomboid-oblong, ascending, 1 to 2 cm. long, the rachis densely pubescent, the tip 3-cleft; spikelets several, subpectinate; rachis broad, densely pubescent on the margin; glumes and fertile lemma densely pubescent, the lemma 3-cleft, the divisions awn-tipped; rudiment cleft nearly to the base, the middle awn broadly winged, the lateral ones slen-

der, all spreading. 2l —Mesas and rocky hills, western Texas to southern Arizona; Mexico and Guatemala.

7. *Bouteloua radicosa* (Fourn.) Griffiths. PURPLE GRAMA. (Fig. 778.) Perennial, tufted, from a stout rhizomatous base; culms erect, 60 to 80 cm. tall; blades 2 to 3 mm. wide, sparsely papillose-ciliate on the margin, mostly aggregate toward the lower part of the culm, the upper part naked; axis 10 to 15 cm. long; spikes mostly 7 to 12, oblong, 2 to 3 cm. long; spikelets mostly 8 to 11; glumes broader than in other species; fertile

lemma indurate down the center, with 3 awns, the middle longest, and no intermediate lobes; rudiment with 3 awns 5 to 8 mm. long and no intermediate lobes, usually containing a palea and staminate flower sometimes a perfect flower, the lower floret being staminate. 2 —Rocky hills, southern New Mexico to southern California and Mexico.

8. ***Bouteloua filiformis*** (Fourn.) Griffiths. SLENDER GRAMA. (Fig. 779.) Resembling *B. radicata*; culms erect or geniculate-spreading, sparingly branching, the base not rhizomatous; spikes ascending to spreading, mostly about 1.5 cm. long, sometimes as much as 2 cm.; spikelets mostly 6 to 10, very like those of *B. radicata*. 2 —Rocky hills, Texas to Arizona and Mexico; Panama.



FIGURE 778.—*Bouteloua radicata*. Panicle, $\times 1$; spikelet, $\times 5$. (Griffiths 7181, Ariz.)

SECTION 2. CHONDROSIUM (Desv.) Benth.

Spikes persistent; spikelets crowded (looser in *B. eriopoda*), pectinate; florets falling from the glumes. (*Chondrosium* Desv. based on *C. procumbens* Durand (*B. simplex*).



FIGURE 777.—*Bouteloua chondrosioides*. Panicle, $\times 1$; spikelet, $\times 5$. (Type.)



FIGURE 779.—*Bouteloua filiformis*. Panicle, $\times 1$; spikelet, $\times 5$. (Griffiths 7199, Ariz.)

9. ***Bouteloua simplex*** Lag. MAT GRAMA. (Fig. 780.) Annual, tufted, prostrate or ascending; foliage scant; blades 2 to 3 cm. long, about 1.5 mm. wide; spike solitary, 1.5 to 2.5 cm.



FIGURE 780.—*Bouteloua simplex*. Plant, $\times 1$; spikelet, $\times 5$. (Griffiths 7362, Ariz.)

long, strongly arcuate at maturity; spikelets mostly 20 to 30, about 5 mm. long; fertile lemma pilose at base with stout awns and subacute intermediate lobes; rudiment bearded at summit of rachilla-joint, cleft to the base or nearly so, the awns equal, a second rudiment, broad and awnless, sometimes developed. ☉ (*B. procumbens* Griffiths.)—Open ground, Texas to Colorado, Utah, Arizona, and Mexico; wool waste, Maine; Ecuador to Argentina.

10. *Bouteloua barbata* Lag. SIX-WEEKS GRAMA. (Fig. 781.) Annual, tufted, branching, erect to prostrate, often forming mats with ascending ends, the culms as much as 30 cm. long; foliage scant; blades 1 to 4 cm. long, 1 to 1.5 mm. wide; spikes 4 to

7, 1 to 2 cm. long; spikelets 25 to 40, 2.5 to 4 mm. long, nearly as broad; fertile lemma densely pilose at least along the sides, usually throughout, the awns from minute to as long as the body, the intermediate lobes subacute to obtuse; rudiment from obscurely to conspicuously bearded at summit of rachilla joint, cleft nearly to the base, the intermediate lobes broad, subcucullate, the awns of rudiment and fertile lemma reaching about the same height, a second rudiment, broad and awnless, often developed. ☉ (*B. microstachya* L. H. Dewey.)—Open ground, mesas, and rocky hills, Texas and Colorado to Nevada and southeastern California; Mexico. The awns vary in length. The form with shorter awns is that described as *B. pumila* Buckl.; the longer awned form is that described as *B. arenosa* Vasey.

11. *Bouteloua parryi* (Fourn.) Griffiths. PARRY GRAMA. (Fig. 782.)

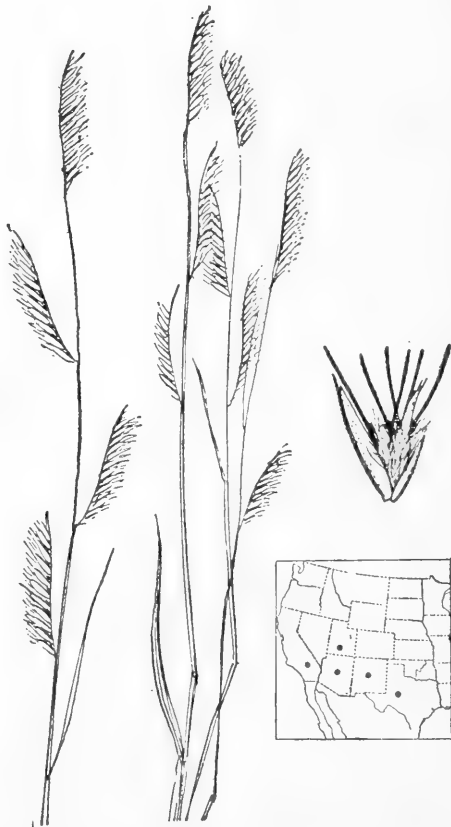


FIGURE 781.—*Bouteloua barbata*. Plant, $\times 1$; spikelet, $\times 5$. (Griffiths 6095, Ariz.)

Annual, resembling *B. rothrockii*; culms erect or geniculate-spreading, sometimes branching; blades papillose-pilose; spikes 4 to 8, often flexuous, commonly grayish purple, 2 to 3.5 cm. long; rachis papillose-pilose; spikelets 40 to 65, about 6 mm. long; second glume awned from a bifid tip, the keel papillose-pilose with spreading hairs; fertile lemma densely pilose, deeply cleft, the awns spreading, the oblong intermediate lobes fimbriate; rudiment densely bearded at summit of rachilla, cleft nearly to the base, the lobes obovate, fimbriate, the awns exceeding those of the fertile lemma; a second rudiment, broad, awnless or with a single awn, usually developed. ☉ —Mesas and rocky hills, New Mexico, Arizona, and northern Mexico.

12. *Bouteloua rothrockii* Vasey. ROTHROCK GRAMA. (Fig. 783.) Perennial, sometimes appearing to be annual; culms tufted, erect, 25 to 50 cm. tall; blades 2 to 3 mm. wide; axis 10 to 25 cm. long; spikes 4 to 12, 2.5 to 3 cm. long, straight to subarcuate;



FIGURE 783.—*Bouteloua rothrockii*. Panicle, $\times 1$; spikelet, $\times 4$. (Griffiths 7185, Ariz.)



FIGURE 782.—*Bouteloua parryi*. Panicle, $\times 1$; spikelet, $\times 5$. (Griffiths 7277, Ariz.)

spikelets 40 to 50, about 5 mm. long; fertile lemma pilose at base, deeply cleft, the awns (1 to 2 mm. long) spreading, the intermediate and lateral lobes fimbriate; rudiment densely bearded at summit of rachilla joint, cleft nearly to the base, the lobes broad and rounded, the awns mostly exceeding those of the fertile lemma; a second rudiment, broad and awnless, usually developed. 24 — Mesas, canyons, and rocky hills, in open ground, or among brush, Arizona and southern California (Jamaica), to northern Mexico.

13. *Bouteloua glandulosa* (Cervant.) Swallen. (Fig. 784.) Similar to *B. hirsuta*; lower part of the culms and the lower sheaths conspicuously papillose-hirsute with ascending or spreading hairs; blades flat, attenuate, 2 to 3 mm. wide, more or less ciliate or hairy toward the base; spikes 1 to 3, ascending to reflexed, the rachis prolonged beyond the spikelets as a prominent bristle,

commonly 1 to 1.5 cm. long; spikelets similar to those of *B. hirsuta*, but the awns of the rudiment somewhat longer, the spikes more bristly. 2 *B. hirticulmis* Scribn.—Rocky hills, prairies, and open ground, Arizona (Santa Cruz County); Mexico.

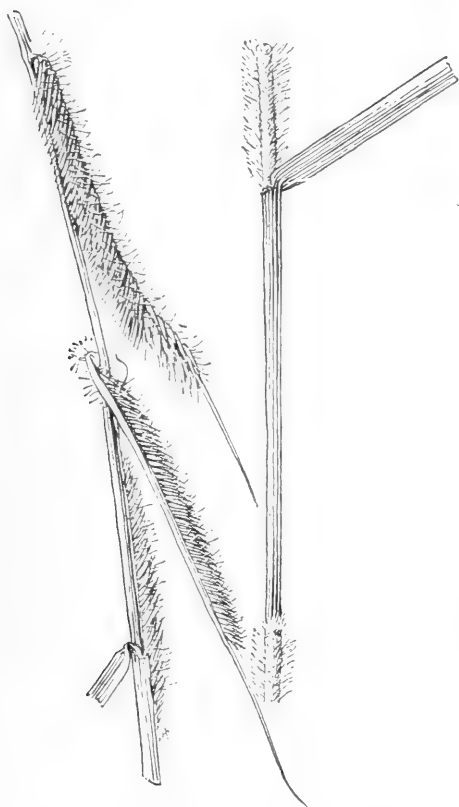


FIGURE 784.—*Bouteloua glandulosa*. Panicle, $\times 1$. (Type of *B. hirticulmis*.)

14. *Bouteloua hirsuta* Lag. HAIRY GRAMA. (Fig. 785.) Perennial, densely tufted; culms erect, 20 to 60 cm. tall, leafy at base; blades flat or sub-involute, about 2 mm. wide, flexuous; spikes 1 to 4, usually 2, 2.5 to 3.5 cm. long, the rachis extending beyond the spikelets as a slender point 5 to 8 mm. long; spikelets 35 to 45, about 5 mm. long, second glume tuberculate-hirsute with spreading hairs, the tubercles black; fertile lemma 3-cleft, the divisions and margins of lemma pubescent, awn-tipped; rudiment from puberulent to bearded at summit of rachilla, cleft nearly to the base, the lobes firm, broad, spreading, the awns black. 2 —Plains and rocky

hills, Wisconsin and North Dakota to Texas, Colorado, Arizona, and California (Jamacha), south through Mexico; also peninsular Florida. *Bouteloua pectinata* Featherly was differentiated from *B. hirsuta* by taller more robust culms and by a rudimentary spikelet at the end of the rachis. Such a spikelet is rarely developed in *B. hirsuta*, but it is not correlated with robust plants.

15. *Bouteloua gracilis* (H. B. K.) Lag. ex Steud. BLUE GRAMA. (Fig. 786.) Perennial; densely tufted; culms erect, 20 to 50 cm. tall, leafy at base; blades flat or loosely involute, 1 to 2 mm. wide; spikes usually 2, sometimes 1 or 3, rarely more, 2.5 to 5 cm. long, falcate-spreading at maturity, the rachis not projecting beyond the spikelets; spikelets numerous, as many as 80, about 5 mm. long; fertile lemma pilose, the awns slender, the intermediate lobes acute; rudiment densely bearded at summit of



FIGURE 785.—*Bouteloua hirsuta*. Panicle, $\times 1$; spikelet, $\times 5$. (Griffiths 3371, Ariz.)

rachilla, cleft to the base, the lobes rounded, the awns slender, about equaling the tip of fertile lemma; one or two additional rudiments, broad and awnless, sometimes developed. 2 (*B. oligostachya* Torr.) —Plains, Wisconsin to Manitoba and



FIGURE 787.—*Boteloua breviseta*. Panicle, $\times 1$; spikelet, $\times 5$. (Nealley 669, Tex.)

Alberta, south to Arkansas, Texas, and southern California; Mexico; introduced in a few places in the Eastern States.

BOUTELOUA GRACILIS var. *STRÍCTA* (Vasey) Hitchc. Spikes 4 to 6, usually ascending or appressed. 2 — Rare, Texas and Arizona.

16. *Bouteloua breviséta* Vasey. (Fig. 787.) Perennial, wiry, the base perennial, woody, loosely tufted; culms branching, 25 to 40 cm. tall; blades 3 to 6 cm. long, 1 to 1.5 mm. wide, flat or becoming involute, sharp-pointed; spikes mostly 2, sometimes 1, rarely 3, 2 to 3 cm. long; spikelets 30 to 45, about 4 mm. long; fertile lemma pubescent, with 3 awns and acuminate intermediate

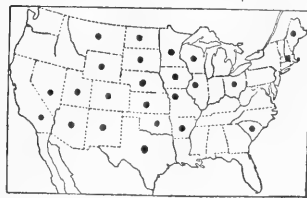


FIGURE 786.—*Bouteloua gracilis*. Plant, $\times \frac{1}{2}$; glumes and florets, $\times 5$. (Amer. Gr. Natl. Herb. 384, Nev.)

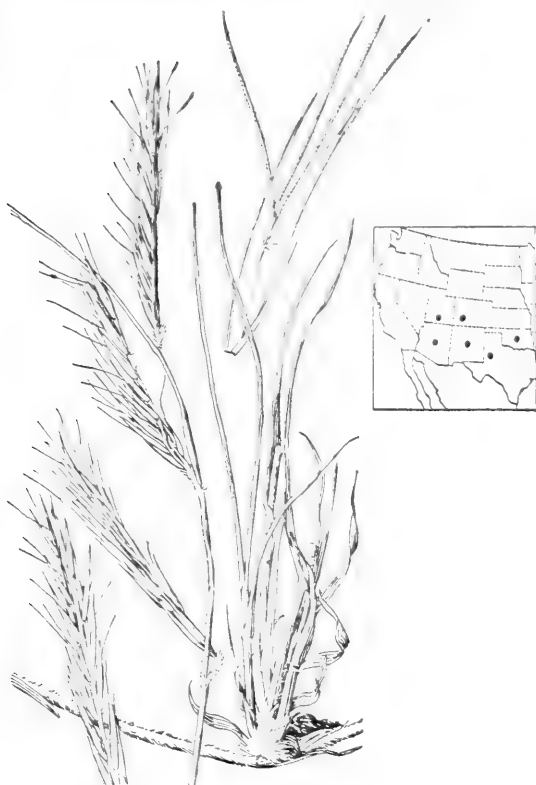


FIGURE 788.—*Bouteloua eriopoda*. Plant, $\times 1$; spikelet, $\times 5$. (Hitchcock 13357, Tex.)

lobes; rudiment densely bearded at summit of rachilla joint, cleft nearly to the base, the rounded lobes obscured in the dense hairs. 2 (*B. ramosa* Scribn.)—Gypsum sands and calcareous rocks, western Texas, New Mexico, and northern Mexico. Resembling *B. gracilis* but with loose, woody base and wiry culms; rachis prolonged and bearing a rudimentary spikelet at the tip.

17. *Bouteloua eriopoda* (Torr.) Torr. BLACK GRAMA. (Fig. 788.) Perennial; culms tufted, with swollen bases, slender, wiry, widely spreading with arched internodes or stoloniferous, white-lanate, 40 to 60 cm. long; blades 1 to 1.5 mm. wide, flexuous; spikes 3 to 8, commonly 4 or 5, loosely ascending, 2 to 3 cm. long; spikelets 12 to 20, not crowded and pectinate, 7 to 10 mm. long, narrow; fertile lemma acuminate, with a terminal awn, the lateral minute or obsolete; rudiment slender, cleft nearly to the base, the awns equaling the awn of the fertile lemma, the lobes minute, narrow. 2 —Mesas, hills, and dry open ground, Oklahoma and Texas to Colorado, Utah, southern California, and northern Mexico.

18. *Bouteloua trifida* Thurb. (Fig. 789.) Perennial, tufted, leafy at base, rather delicate; culms erect, 10 to 20 cm. tall; blades usually only 1 to 2 cm. long; spikes 3 to 7, 1 to 2 cm. long, ascending or appressed; spikelets about 12, purplish, 7 to 10 mm. long; fertile lemma pubescent toward base, cleft more than half its length, with awns (5 mm. long) winged toward base and no intermediate lobes; rudiment cleft to the base, the awns similar to those of the fertile lemma, about as long. 2 (*B. trinii* Griffiths; *B. burkii* Scribn.)—Mesas, ravines, and rocky hills, Texas to Nevada and Arizona; California (Death Valley); northern Mexico. Variable in length of the awns, the type of *B. trifida* being the longer awned form.



FIGURE 789.—*Bouteloua trifida*. Panicle, $\times 1$; spikelet, $\times 5$. (Amer. Gr. Natl. Herb. 669, Tex.)



FIGURE 790.—*Cathetecum erectum*. Plant, $\times \frac{1}{2}$; group of spikelets, central spikelet, and fertile floret, $\times 5$. (Palmer 161, Mex.)

113. CATHÉSTECUM Presl

Spikes consisting of 3 spikelets, the upper or central perfect, the 2 lateral staminate or rudimentary, the spike falling entire; central spikelet with 1 perfect floret below and 1 or more reduced florets above; glumes unequal, the first a short, thin, nerveless scale in the central spikelet, nar-

row and acuminate in the lateral spikelets, the second about as long as the lemma, acuminate, all usually villous; lemma 3-nerved, the nerves extending into awns and the internerves into teeth; nerves of the palea extending into short awns; second and third floret with a fairly well developed lemma and palea, the fourth floret, if present, usually re-

duced. Low tufted or stoloniferous annuals or perennials, with short blades, and several to many short deciduous spikes approximate on a slender flexuous axis. Type species, *Cathestecum prostratum* Presl. Name from Greek *kathestekos*, set fast, stationary, the application not obvious.

1. *Cathestecum erectum* Vasey and Hack. (Fig. 790.) Perennial with wiry stolons having arched internodes and hairy nodes; culms slender, 10 to 30 cm. tall; blades flat, about 1 mm. wide, mostly basal; spikes 4 to 8, ovoid, about 5 mm. long; lateral spikelets about two-thirds as long as the central spikelet; lemmas of all spikelets similar, the sterile ones more deeply lobed; awns from about as long as the lobes to twice as long, hairy at base. 2 — Dry hills, western Texas, southern Ari-

zona, and northern Mexico.

114. *MUNRÓA* Torr.

Spikelets in pairs or threes on a short rachis, the lower 1 or 2 larger, 3- or 4-flowered, the upper 2- or 3-flowered, the group (reduced spikes) enclosed in the broad sheaths of short leaves, usually about 3 in a fascicle, forming a cluster or head at the ends of the branches; rachilla disarticulating above the glumes and between the florets; glumes of the lower 1 or 2 spikelets equal, 1-nerved, narrow, acute, a little shorter than the lemmas, those of the upper spikelet unequal, the first much shorter or obsolete; lemmas 3-nerved, those of the lower spikelet coriaceous, acuminate, the points spreading, the midnerve extended into a mucro, those of the upper spikelet mem-



FIGURE 791.—*Munroa squarrosa*. Plant, $\times \frac{1}{2}$; group of spikelets, spikelet, and floret, $\times 5$. (Zuck 43, Ariz.)

branaceous; palea narrow, enclosing the oval, dorsally compressed caryopsis. Low-spreading, much-branched annual, the short, flat, pungent leaves in fascicles. Type species, *Munroa squarrosa*. Named for William Munro.

1. *Munroa squarrosa* (Nutt.) Torr.

FALSE BUFFALO GRASS. (Fig. 791.)

Forming mats as much as 50 cm. in diameter, the internodes of the prostrate culms scabrous, as much as 10 cm. long, the fascicles at the nodes consisting of several short leafy branches, with 1 or 2 longer branches with slender internodes; blades stiff, mostly less than 3 cm. long, 1 to 3 mm. wide; fascicles of spikelets about 7 mm. long; lemmas with a tuft of hairs on the margin about the middle.

☉ —Open ground, plains, and hills, at medium altitudes, common in old fields and recently disturbed soil, Alberta and North Dakota to Montana, south to Texas, Arizona, and Nevada. Occasional plants are found with a white floccose covering, the remains of egg cases of a species of woolly aphid. The variety *floccuosa* Vasey was described from such a specimen.

115. *BÚCHLOË* Engelm.

(*Bulbilis* Raf.)

Plants dioecious or monoecious. Staminate spikelets 2-flowered, sessile and closely imbricate, in 2 rows on one side of a slender rachis, forming a short spike; glumes somewhat unequal, rather broad, 1-nerved, acutish; lemmas longer than the glumes, 3-nerved, rather obtuse, whitish; palea as long as its lemma. Pistillate spikelets mostly 4 or 5 in a short spike or head, this falling entire, usually 2 heads to the inflorescence, the common peduncle short and included in the somewhat inflated sheaths of the upper leaves, the thickened indurate rachis and broad outer (second) glumes forming a rigid white obliquely globular structure crowned by the green-toothed summits of the glumes; first glume (inside) narrow, thin, mucronate, well

developed to obsolete in a single head; second glume firm, thick and rigid, rounded on the back, obscurely nerved, expanded in the middle, with inflexed margins, enveloping the floret, abruptly contracted above, the summit with 3 green rigid acuminate lobes; lemma firm-membranaceous, 3-nerved, dorsally compressed, broad below, narrowed into a 3-lobed green summit, the middle lobe much the larger; palea broad, obtuse, about as long as the body of the lemma, enveloping the caryopsis. A low stoloniferous perennial with short curly blades, the staminate flowers in 2 or 3 short spikes on slender, erect culms, the pistillate in sessile heads partly hidden among the leaves. Type species, *Buchloë dactyloides*. Name contracted from Greek *boubalos*, buffalo, and *chloë*, grass, a Greek rendering of the common name, "buffalo grass."

1. *Buchloë dactyloides* (Nutt.)

Engelm. BUFFALO GRASS. (Fig. 792.)

Gray green, forming a dense sod, the curly blades forming a covering 5 to 10 cm. thick; blades rather sparsely pilose, 1 to 2 mm. wide; staminate culms slender, 5 to 20 cm. tall, the spikes 5 to 15 mm. long; pistillate heads 3 to 4 mm. thick. 2 —

Dry plains, western Minnesota to central Montana, south to northwestern Iowa, Texas, western Louisiana, Arizona, and northern Mexico. Buffalo grass forms, when unmixed with other species, a close soft grayish-green turf. It is dominant over large areas on the uplands of the Great Plains, colloquially known as the "short-grass country," and is one of the most important grazing grasses of this region. The foliage cures on the ground and furnishes nutritious feed during the winter. The sod houses of the early settlers were made mostly from the sod of this grass. In 1941 it was planted at Boyce Thompson Institute, Yonkers, N. Y., and is proving to be an excellent cover for exposed dry banks.



FIGURE 792.—*Buchloë dactyloides*. Pistillate and staminate plants, $\times \frac{1}{2}$; pistillate spike and floret, $\times 5$; staminate spikelet, $\times 5$. (Ruth 156, Tex.)

TRIBE 8. PHALARIDEAE

116. HIERÓCHLOË R. Br.

(Savastana Schrank; *Torresia* Ruiz and Pav.)

Spikelets with 1 terminal perfect floret and 2 staminate florets, disarticulating above the glumes, the staminate florets falling attached to the fertile one; glumes equal, 3-nerved, broad, thin and papery, smooth, acute; staminate lemmas about as long as the glumes, boat-shaped, hispidulous, hairy along the margin; fertile lemma somewhat indurate, about as long as the others, smooth or nearly so, awnless; palea 3-nerved, rounded on the back. Perennial, erect, slender, sweet-smelling grasses, with small panicles of broad, bronze-colored spikelets. Type species, *Hierochloë antarctica* (Labill.) R. Br. Name from Greek *hieros*, sacred, and *chloë*, grass, holy grass; *H. odorata* was used in parts of Europe for "strewing before the doors of churches on festival days."

Flowering culms with short blades only (rarely to 10 cm. long) with few to many long-leaved sterile shoots at base.

Staminate lemmas bearing exerted awns..... 1. *H. ALPINA*.
 Staminate lemmas awnless or nearly so..... 2. *H. ODORATA*.
 Flowering culms with blades 25 to 50 cm. long..... 3. *H. OCCIDENTALIS*.

1. Hierochloë alpína (Swartz)

Roem. and Schult. (Fig. 793.) Culms 10 to 40 cm. tall, tufted, with leafy shoots at base and short rhizomes; blades 1 to 2 mm. wide, the basal ones elongate, those of the culm shorter and wider; panicle contracted, 3 to 4 cm. long; spikelets short-pediceled, 6 to 8 mm. long; staminate lemmas ciliate on the margin, awned below the tip, the awn of the second lemma 5 to 8 mm. long, bent, twisted below, that of the first a little shorter, straight; fertile lemma acute, appressed-pubescent toward apex. 21 —Arctic regions, Greenland to Alaska, south to Newfoundland and Quebec; alpine meadows and rocky slopes, high mountains, Maine, New Hampshire, Vermont, New York, and Montana; Europe.

2. Hierochloë odoráta (L.) Beauv. SWEETGRASS. (Fig. 794.) Culms 30 to 60 cm. tall, with few to several leafy shoots and slender, creeping rhizomes; blades 2 to 5 mm. wide, sometimes wider, those of the sterile shoots elongate, those of the culm mostly less than 5 cm. long, rarely to 10 cm. long; panicle pyramidal, 4 to 12 cm. long, from somewhat compact to loose with slender drooping branches; spikelets mostly short-pediceled, 5 mm. long; staminate



FIGURE 793.—*Hierochloë alpína*. Plant, $\times 1$; spikelet and floret, $\times 5$. (Hitchcock 16058, N. H.)

lemmas awnless or nearly so, fertile lemma pubescent toward the apex. 21 —Meadows, bogs, and moist places, Labrador to Alaska, south to New Jersey, Indiana, Iowa, Oregon, and in the mountains to New Mexico and Arizona; Eurasia. The Indians use the grass, known as Seneca grass, to make fragrant baskets. Also called holy grass and vanilla grass. A tall form with culm blades 12 to 17 cm. long, and a very loose lax panicle,



FIGURE 794.—*Hierochloë odorata*. Plant, $\times \frac{1}{2}$; spikelet, florets, and fertile floret, $\times 5$. (Shear 437, Mont.)

found in Van Cortlandt Park, New York City, has been described as *Hierochloë nashii* Kaczmarek (*Savastana nashii* Bickn.).

3. *Hierochloë occidentális* Buckl.
CALIFORNIA SWEETGRASS. (Fig. 795.)

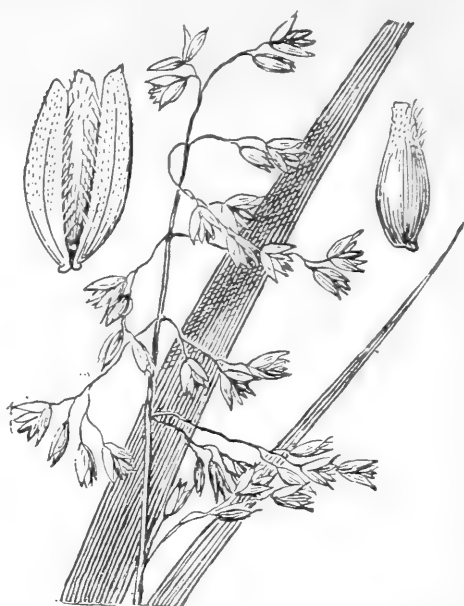
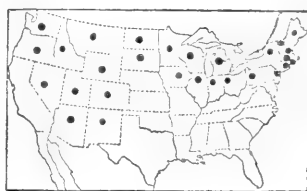


FIGURE 795.—*Hierochloë occidentális*. Plant, $\times 1$; spikelet and fertile floret, $\times 5$. (Bolander, Calif.)

Culms 60 to 90 cm. tall, with long leaves and creeping rhizomes; sheaths scabrous; blades flat, rather stiffly upright, 25 to 50 cm. long, 8 to 15 mm. wide, narrowed to the base, acuminate, scabrous beneath; panicle



mostly open, 7 to 15 cm. long, the subcapillary branches drooping, loosely flowered or the spikelets aggregate toward the ends, the lower branches 2.5 to 7 cm. long; spikelets 4 to 5 mm. long, the glumes with a pale

shining margin; staminate lemmas awnless or nearly so; fertile lemma appressed-pubescent toward apex.

2 (*H. macrophylla* Thurb.)—Forests in the redwood belt, Oregon to Monterey, Calif.; Bingen, Wash.

117. ANTHOXANTHUM L. VERNALGRASS

Spikelets with 1 terminal perfect floret and 2 sterile lemmas, the rachilla disarticulating above the glumes, the sterile lemmas falling attached to the fertile floret; glumes unequal, acute or mucronate; sterile lemmas shorter than the glumes, empty, awned from the back; fertile lemma shorter than the sterile ones, awnless; palea 1-nerved, rounded on the back, enclosed in the lemma. Sweet-smelling annuals or perennials, with flat blades and spikelike panicles. Type species, *Anthoxanthum odoratum*. Name from Greek *anthos*, flower, and *xanthos*, yellow, alluding to the yellow inflorescence.

Plants perennial..... 1. *A. ODORATUM*.
Plants annual..... 2. *A. ARISTATUM*.

1. *Anthoxanthum odoratum* L.

SWEET VERNALGRASS. (Fig. 796, A.) Culms tufted, erect, slender, 30 to 60 cm. tall, rarely to 1 m. tall; blades 2 to 5 mm. wide; panicle long-exserted, brownish yellow, acute, 2 to 6 cm. long; spikelets 8 to 10 mm. long; glumes scabrous, the first about half as long as the second; sterile lemmas subequal, appressed-pilose with golden hairs, the first short-awned below the apex, the second awned from near the base, the awn twisted below, geniculate, slightly exceeding the second glume; fertile lemma about 2 mm. long, brown, smooth and shining. 2 —Meadows, pastures, and waste places, Greenland and Newfoundland to Louisiana and Michigan, and on the Pacific coast from British Columbia to California; introduced from Eurasia. Sometimes included in meadow mixtures to give fragrance to the hay, but the grass has little forage value.

2. *Anthoxanthum aristatum* Boiss. (Fig. 796, B.) Differing from *A. odoratum* in being annual, the culms lower, often geniculate and bushy branching; panicles looser; spikelets a little smaller. ☉ —Waste places in several localities from Maine to Iowa; West Virginia; North Carolina; Florida; Mississippi and Arkansas; Vancouver Island to California; introduced from Europe.

ANTHOXANTHUM GRACILE BIVON. Tufted annual; culms 20 cm. tall; blades pubescent; panicle silvery; spikelets about 12 mm. long, conspicuously awned. ☉ —Occasionally cultivated for dry bouquets. Italy.

EHRHARTA Thunb.

Spikelets laterally compressed with 1 fertile floret and 2 large sterile lemmas below enclosing the fertile floret; rachilla disarticulating above the glumes, the fertile floret and sterile lemmas falling together; glumes ovate, rather obscurely keeled; sterile lemmas indurate, compressed, 3- to 5-nerved; fertile lemma indurate, ovate, 5-nerved, obtuse. Erect or decumbent spreading annuals or perennials with flat blades and narrow panicles. Type species, *Ehrharta capensis* Thunb. Named for Friedrich Ehrhart.

Ehrharta erecta Lam. Culms erect or ascending from a decumbent base, branching, mostly 30 to 50 cm. tall; blades 5 to 12 cm. long, 4 to 9 mm. wide; panicles 6 to 15 cm. long, the branches narrowly ascending or sometimes spreading; spikelets 3 to 3.5 mm. long; sterile lemmas awnless, the first smooth, the second cross-wrinkled. 2 —Escaped, Berkeley, Calif. Introduced from South Africa. Shows considerable competitive ability and may become of value in re-

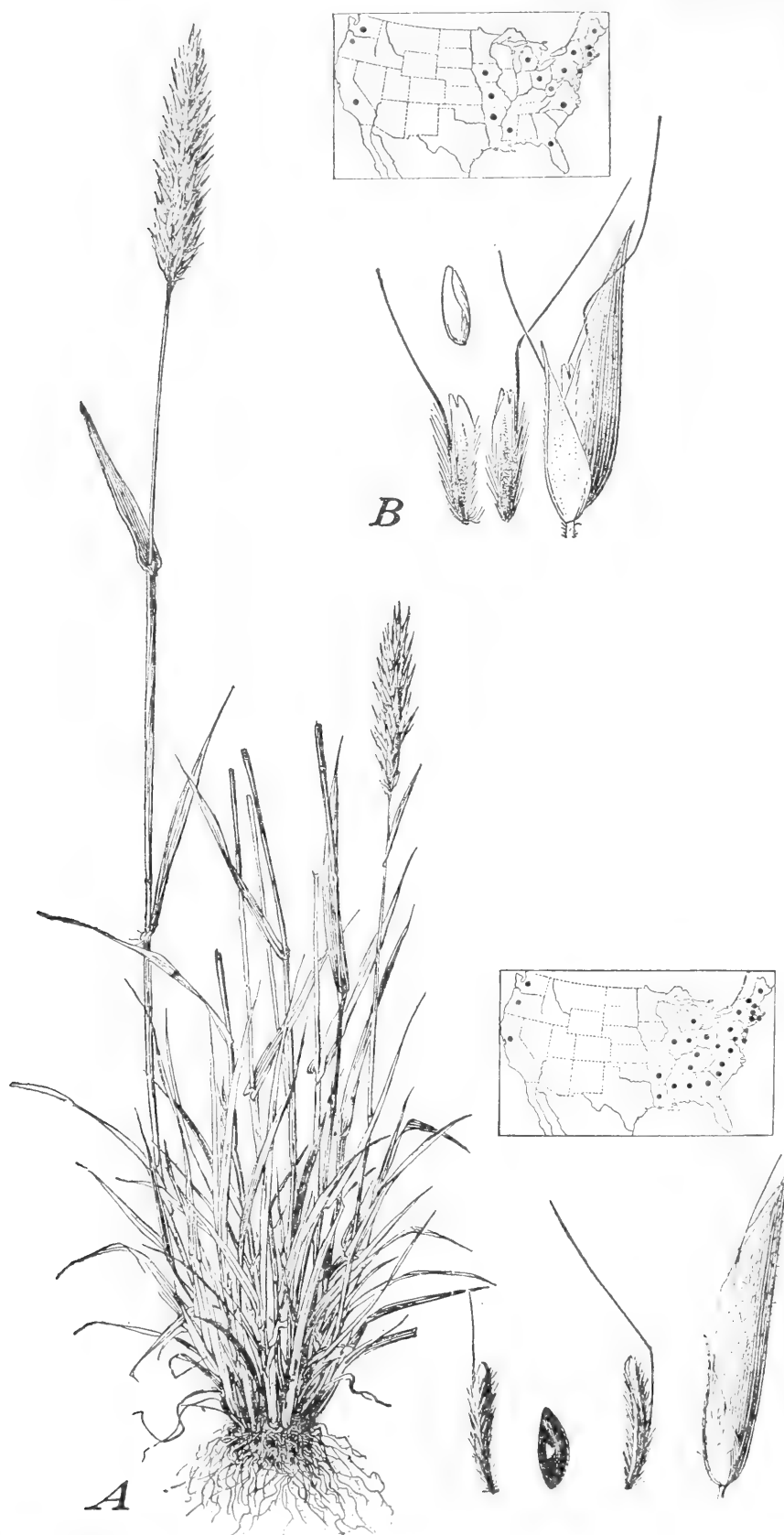


FIGURE 796.—A, *Anthoxanthum odoratum*. Plant, $\times \frac{1}{2}$; spikelet, sterile lemmas, and fertile floret, $\times 5$. (Biltmore Herb. 74b, N. C.) B, *A. aristatum*. Spikelet, sterile florets, and fertile floret, $\times 5$, (White 1591, N. Y.)

placing some of the troublesome weeds.

EHRHARTA CALYCINA J. E. Smith. Erect leafy perennial to 75 cm. tall; panicle 10 to 15 cm. long, branchlets and pedicels subcapillary; spikelets 7 to 8 mm. long, pur-

plish; glumes nearly as long as the lemmas; sterile lemmas thinly silky-villous; fertile lemma silky on the nerves. 2 —Grown at Davis, Calif., as a promising drought-resistant grass for nonirrigated range lands. Introduced; South Africa.

118. *PHALARIS* L. CANARY GRASS

Spikelets laterally compressed, with 1 terminal perfect floret and 2 sterile lemmas below (obsolete in *Phalaris paradoxa*), the rachilla disarticulating above the glumes, the usually inconspicuous sterile lemmas falling closely appressed to the fertile floret; glumes equal, boat-shaped, often winged on the keel; sterile lemmas reduced to 2 small, usually minute, scales (rarely only 1); fertile lemma coriaceous, shorter than the glumes, enclosing the faintly 2-nerved palea. Annuals or perennials, with numerous flat blades, and narrow or spikelike panicles. Type species, *Phalaris canariensis*. *Phalaris*, an old Greek name for a grass.

Spikelets in groups of 7, 1 fertile surrounded by 6 sterile, the group falling entire.

1. *P. PARADOXA*.

Spikelets all alike, not in groups falling entire.

Plants perennial.

Rhizomes wanting; panicle dense, ovate or oblong..... 8. *P. CALIFORNICA*.

Rhizomes present; panicle narrow, spreading during anthesis.... 9. *P. ARUNDINACEA*.

Plants annual.

Glumes broadly winged; panicle ovate or short-oblong.

Sterile lemma solitary; fertile lemma 3 mm. long..... 4. *P. MINOR*.

Sterile lemmas 2, fertile lemma 4 to 6 mm. long.

Sterile lemmas 0.6 mm. long or less..... 3. *P. BRACHYSTACHYS*.

Sterile lemmas half as long as fertile..... 2. *P. CANARIENSIS*.

Glumes wingless or nearly so; panicles oblong or linear, dense.

Glumes wingless, acuminate; fertile lemma turgid, the acuminate apex smooth.

7. *P. LEMMONI*.

Glumes narrowly winged toward summit, acute or abruptly pointed; fertile lemma less turgid, villous to the acute apex.

Panicle tapering to each end, mostly 2 to 6 cm. long (occasionally longer).

5. *P. CAROLINIANA*.

Panicle subcylindric, mostly 6 to 15 cm. long (occasionally smaller).

6. *P. ANGUSTA*.

1. *Phalaris paradóxa* L. (Fig. 797.)

Annual, tufted, more or less spreading at base; culms 30 to 60 cm. tall; panicle dense, oblong, narrowed at base, 2 to 6 cm. long, often enclosed at base in the uppermost enlarged sheath; spikelets finally falling from the axis in groups of 6 or 7, those of the upper part of the panicle slender-pedicel, the central spikelet fertile, the subulate-acuminate glumes with a prominent toothlike wing near the middle of the keel, the others sterile, with smaller pointed glumes with toothed-winged keels; fertile lemma 3 mm. long, with only a few hairs toward the summit, the sterile lemmas obsolete;

spikelets of lower part of panicle short-pedicel, the glumes of the outer 4 spikelets deformed, cuneate-clavate. ☉ —Occasional in grain-fields and waste places, California and Arizona; ballast, Philadelphia, New Orleans; introduced from Mediterranean region.

PHALARIS PARADOXA var. *PRÆMÓRSA* (Lam.) Coss. and Dur. Panicle mostly smaller, all the spikelets short-pedicel and with outer sterile spikelets having deformed clavate glumes, as in the lower part of panicle of the species; glumes of all spikelets subindurate. ☉ —Fields and waste



FIGURE 797.—*Phalaris paradoxa*. Plant, $\times 1$; sterile (A) and fertile (B) spikelets, $\times 5$. (Heller 11391, Calif.)

places, Washington to California and Arizona; ballast, Philadelphia; introduced from Mediterranean region.

2. *Phalaris canariensis* L. CANARY GRASS. (Fig. 798.) Annual; culms erect, 30 to 60 cm. tall; panicle ovate to oblong-ovate, dense, 1.5 to 4 cm. long; spikelets broad, imbricate, pale with green stripes; glumes 7 to 8 mm. long, abruptly pointed, the green keel with a prominent pale wing, broadened upward; fertile lemma 5 to 6 mm. long, acute, densely appressed-pubescent; sterile lemmas at least half as long as fertile. ☉ —Waste places, infrequent, Nova Scotia to Alaska, south to Virginia, Kansas, Wyoming, Arizona, and California, and occasionally southward; introduced from the western Mediterranean region. This species furnishes the canary seed of commerce.

3. *Phalaris brachystachys* Link. (Fig. 799.) Differing from *P. canariensis* in having smaller spikelets, the

glumes about 6 mm. long, the fertile lemma 4 to 5 mm. long, and especially in the short sterile lemmas not more than 0.6 mm. long. ☉ —Texas (Asherton); California (Butte County); Oregon (ballast, near Portland); introduced from the Mediterranean region.

4. *Phalaris minor* Retz. (Fig. 800.) Resembling *P. canariensis*; panicle ovate-oblong, 2 to 5 cm. long; spikelets narrower, not so conspicuously striped; glumes 4 to 6 mm. long, the wing of the keel narrower; fertile lemma lance-ovate, about 3 mm. long, acute; sterile lemma solitary, about 1 mm. long. ☉ —Fields and waste places, New Brunswick to New Jersey, rare; Louisiana and Texas; Colorado; ballast, near Portland, Oreg.; Arizona; frequent in California; Mexico; introduced from the Mediterranean region.

5. *Phalaris caroliniana* Walt. (Fig. 801.) Annual; culms erect, 30 to 60

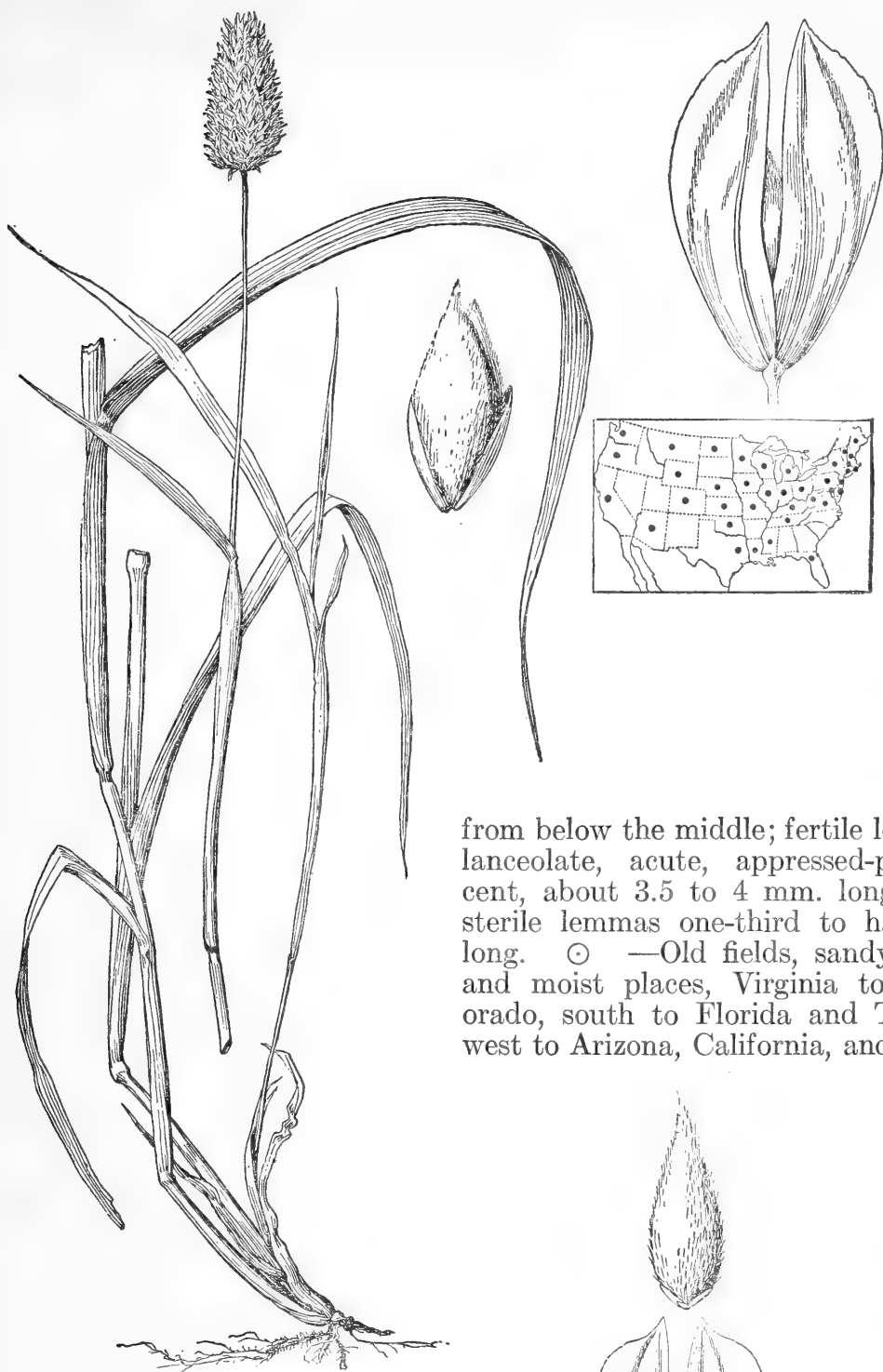


FIGURE 798.—*Phalaris canariensis*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 5$. (Mearns 3376, Wyo.)

from below the middle; fertile lemma lanceolate, acute, appressed-pubescent, about 3.5 to 4 mm. long, the sterile lemmas one-third to half as long. ☉ —Old fields, sandy soil, and moist places, Virginia to Colorado, south to Florida and Texas, west to Arizona, California, and Ore-

cm. tall or even more; panicle oblong, 2 to 6 cm. long, occasionally longer, tapering to each end; glumes 5 to 6 mm. long, oblong, rather abruptly narrowed to an acute apex, the keel scabrous and narrowly winged above

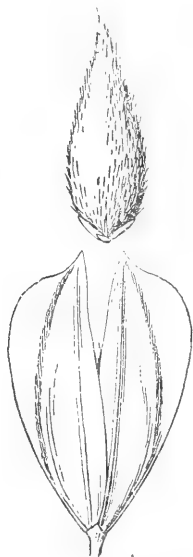


FIGURE 799.—*Phalaris brachystachys*. Spikelet and floret, $\times 5$. (Suksdorf 1904, Oreg.)



FIGURE 800.—*Phalaris minor*. Plant, $\times 1$; glumes and floret, $\times 5$. (Ball 1932, Calif.)

gon. A few specimens from the Pacific coast are relatively robust, up to 80 cm. tall, with panicles 3 to 8 cm. long,

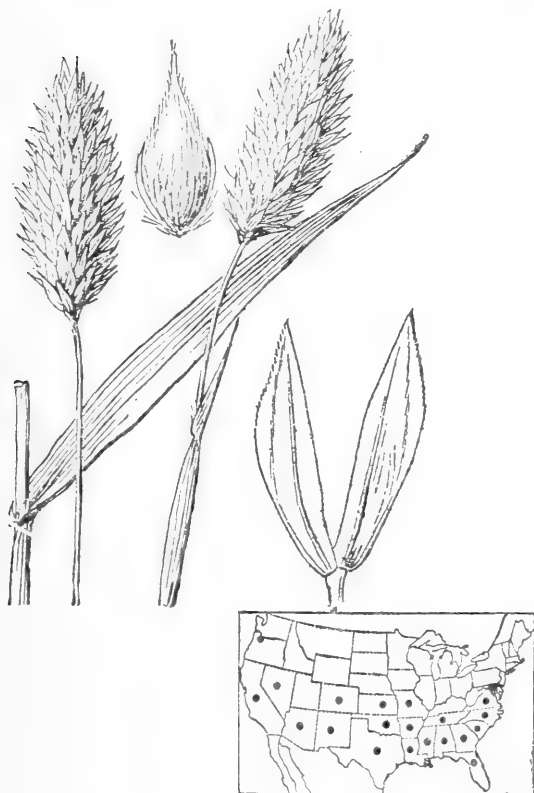


FIGURE 801.—*Phalaris caroliniana*. Plant, $\times 1$; glumes and floret, $\times 5$. (Hitchcock 1074, Miss.)

some of them slightly lobed and not tapering to the base, the spikelets 6 to 6.5 mm. long.

6. *Phalaris angusta* Nees ex Trin. (Fig. 802.) Annual; culms 1 to 1.5 m. tall; panicle subcylindric, mostly 6 to 15 cm. long, about 8 mm. thick; glumes 3.5 to 4 mm. long, narrow, abruptly pointed, the keel scabrous and narrowly winged toward the summit; fertile lemma ovate-lanceolate, acute, appressed-pubescent, 3 mm. long; sterile lemmas about one-third as long. ☉ —Open ground at low altitudes, Mississippi, Louisiana, and Texas; Arizona and California; southern South America.

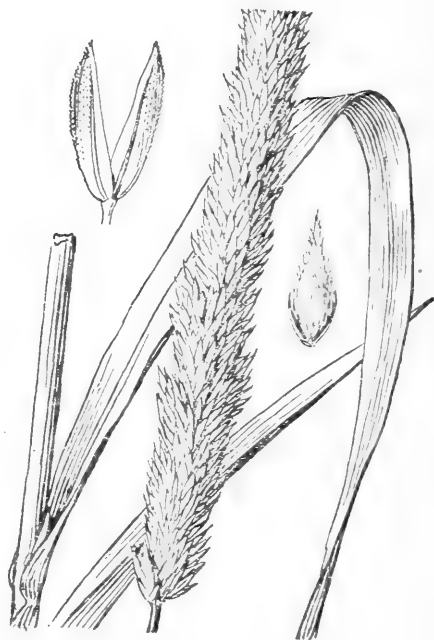


FIGURE 802.—*Phalaris angusta*. Plant, $\times 1$; glumes and floret, $\times 5$. (Suksdorf 32, Calif.)

7. *Phalaris lemmóni* Vasey. (Fig. 803.) Annual; culms 30 to 90 cm. tall; panicle 5 to 15 cm. long, subcylindric or lobed toward base, often purplish; glumes about 5 mm. long, narrow, acuminate, scabrous, not winged on the keel; fertile lemma ovate-lanceolate, acuminate, 3.5 to 4 mm. long, brown at maturity, appressed-pubescent, except the acuminate tip, sterile lemmas (1 or 2) less than one-third as long. ☉ —Moist places, at low altitudes, in the coastal valleys, central and southern California.

8. ***Phalaris californica*** Hook. and Arn. (Fig. 804.) Perennial, often in dense tussocks; culms erect, 75 to 160 cm. tall; blades rather lax, 8 to 15 mm. wide; panicle ovoid or oblong, 2 to 5 cm. long, 2 to 2.5 cm. thick, often purplish-tinged; glumes 6 to 8 mm. long, narrow, tapering from below the middle to an acute apex, the keel smooth or nearly so, sharp but not winged; fertile lemma ovate-lanceolate, about 4 mm. long, rather sparsely appressed-pubescent, the palea often exposed, the sterile lemmas half to two-thirds as long. 2
—Ravines and open moist ground in



FIGURE 803.—*Phalaris lemmoni*. Glumes and floret, $\times 5$. (Type.)

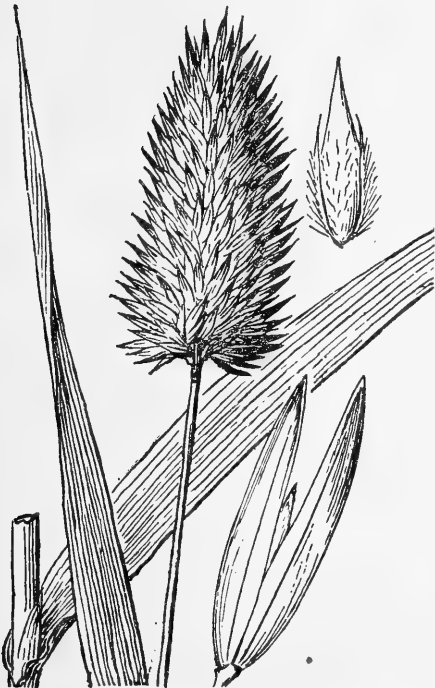


FIGURE 804.—*Phalaris californica*. Plant, $\times 1$; spikelet and floret, $\times 5$. (Heller 6677, Calif.)



FIGURE 805.—*Phalaris arundinacea*. Plant, $\times 1$; glumes and floret, $\times 4$. (Chase 7583, Md.)



FIGURE 806.—*Phalaris tuberosa* var. *stenoptera*, $\times 5$. (McCrary, N. C.)

the Coast Range, southwestern Oregon to San Luis Obispo County, Calif.

9. ***Phalaris arundinacea*** L. REED CANARY GRASS. (Fig. 805.) Perennial, with creeping rhizomes, glaucous; culms erect, 60 to 150 cm. tall; panicle 7 to 18 cm. long, narrow, the branches spreading during anthesis, the lower as much as 5 cm. long; glumes about 5 mm. long, narrow, acute, the keel scabrous, very narrowly winged; fertile lemma lanceolate, 4 mm. long, with a few appressed

hairs; sterile lemmas villous, 1 mm. long. 2 —Marshes, river banks, and moist places, New Brunswick to southeastern Alaska (also at Tanana Hot Springs, Alaska), south to North Carolina, Kentucky, Oklahoma, New Mexico, Arizona, and northeastern California; Eurasia. An important constituent of lowland hay from Montana to Wisconsin. *PHALARIS ARUNDINACEA* var. *PÍCTA* L. RIBBON GRASS. Blades striped with white. 2 — Grown for ornament in gardens; also called gardener's garters.

PHALARIS TUBERÓSA var. *STENOPTERA* (Hack.) Hitchc. (Fig. 806.) Perennial, with a loose branching, rhizomatous base; culms stout, as much as 1.5 m. tall; panicle 5 to 15 cm. long, 1.5 cm. wide, slightly lobed; glumes 5 to 6 mm. long, the keel scabrous, rather narrowly winged on the upper two-thirds; fertile lemma 4 mm. long, ovate-lanceolate, acute, appressed-pubescent; sterile lemma usually solitary, about one-third as long as fertile lemma. 2 —About 1902 there appeared in Queensland, Australia, the source unknown, a species of *Phalaris* which gave promise of being a valuable forage grass. About 1907 it was distributed from the Toowoomba Botanic Gardens, Queensland. Stapf, of Kew Gardens, identified this grass as *P. bulbosa* L. Hackel described it as a distinct species, *P. stenoptera*. It has been grown at the California Experiment Station from seed from South Africa. It has also been cultivated in Oregon, in Washington, D. C., and in North Carolina, and is spontaneous in Humboldt County, Calif. This differs from typical *P. tuberosa* of the Mediterranean region in having short vertical or ascending, sometimes branching, rhizomes, the base of the culms little or not at all swollen. It has been called Harding grass. Burbank distributed it as *P. stenophylla* (error for *stenoptera*), calling it Peruvian wintergrass. The name *P. bulbosa* has been misapplied to *P.*

tuberosa L., but true *P. bulbosa* L. is a species of *Phleum* (*P. tenue* Schrad.; *P. bulbosum* (L.) Richt.).

TRIBE 9. ORYZEAE

119. ORÝZA L. RICE

Spikelets 1-flowered, laterally compressed, disarticulating below the glumes; glumes 2, much shorter than the lemma, narrow; lemma rigid, keeled, 5-nerved, the outer nerves near the margin, the apex sometimes awned; palea similar to the lemma, narrower, keeled, with a median bundle but with no strong midnerve on the back, 2-nerved close to the margins. Annual or sometimes perennial swamp grasses, often tall, with flat blades and spikelets in open panicles. Type species, *Oryza sativa*. Name from *oruza*, old Greek name for rice. The spikelet in *Oryza* and *Leersia* is interpreted by Stapf, Arber, and some others as consisting of 2 greatly reduced glumes and 2 subulate sterile lemmas below the single fertile floret. The true glumes, according to this interpretation, are represented by the minute cuplike expansion, sometimes distinctly 2-lobed, at the summit of the pedicel, persistent and showing no line of demarcation from the pedicel, the articulation of the spikelet being below the sterile lemmas, the latter wanting in *Leersia*. The problem deserves further study.

1. *Oryza sativa* L. RICE. (Fig. 807.) Annual, or in tropical regions sometimes perennial; culms erect, 1 to 2 m. tall; blades elongate; panicle rather dense, drooping, 15 to 40 cm. long; spikelets 7 to 10 mm. long, 3 to 4 mm. wide; lemma and palea papillose-roughened and with scattered appressed hairs, the lemma from mucronate to long-awned. ☉ —Cultivated in all warm countries at low altitudes where there is sufficient moisture; one of the world's most important food plants; sometimes adventive near the coast from Virginia to Florida and Texas.



FIGURE 807.—*Oryza sativa*. Plant, $\times \frac{1}{2}$; spikelet, $\times 5$. (Cult.)

120. *LEERSIA* Swartz(*Homalocenchrus* Mieg.)

Spikelets 1-flowered, strongly compressed laterally, disarticulating from the pedicel; glumes wanting; lemma chartaceous, broad, oblong to oval, boat-shaped, usually 5-nerved, the lateral pair of nerves close to the margins, these and the keel often hispid-ciliate, the intermediate nerves sometimes faint; palea as long as the lemma, much narrower, usually 3-nerved, the keel usually hispid-ciliate, the lateral nerves close to the margins, the margins firmly held by the margins of the lemma; stamens 6 or fewer. Perennials, usually with creeping rhizomes, flat, scabrous blades, and mostly open panicles. Type species, *Leersia oryzoides*. Named for J. D. Leers.

Spikelets broadly oval, 3 to 4 mm. wide..... 1. *L. LENTICULARIS*.

Spikelets elliptic, not more than 2 mm. wide.

Panicle narrow, the branches ascending or appressed..... 4. *L. HEXANDRA*.

Panicle open, the capillary branches finally spreading.

Spikelets glabrous, about 2 mm. long; culms tufted, erect; rhizomes wanting.

5. *L. MONANDRA*.

Spikelets hispidulous; culms decumbent at base; rhizomes present.

Lower panicle branches solitary; spikelets 3 mm. long, 1 mm. wide.

3. *L. VIRGINICA*.

Lower panicle branches fascicled; spikelets 5 mm. long, 1.5 to 2 mm. wide.

2. *L. ORYZOIDES*.

1. *Leersia lenticularis* Michx.

CATCHFLY GRASS. (Fig. 808.) Culms straggling, 1 to 1.5 m. tall, with creeping scaly rhizomes; sheaths scabrous at least toward the summit; blades lax, 1 to 2 cm. wide; panicle open, drooping, 10 to 20 cm. long, the branches ascending or spreading, naked below, branched above, branchlets bearing closely imbricate spikelets along one side; spikelets pale, broadly oval, very flat, 4 to 5 mm. long, sparsely hispidulous, the keels bristly ciliate. ♀ —Ditches and swamps, Maryland to Minnesota, south to Florida and Texas.

2. *Leersia oryzoides* (L.) Swartz.

RICE CUTGRASS. (Fig. 809.) Culms slender, weak, often decumbent at base, 1 to 1.5 m. tall, with slender creeping rhizomes; sheaths and blades strongly retrorsely scabrous, the blades mostly 8 to 10 mm. wide; panicles terminal and axillary, 10 to 20 cm. long, the flexuous branches finally spreading, the spikelets more loosely imbricate than in *L. lenticularis*; spikelets elliptic, 5 mm. long, 1.5 to 2 mm. wide, sparsely hispidulous, the keels bristly ciliate; axillary panicles reduced, partly included in the sheaths, the spikelets cleistog-

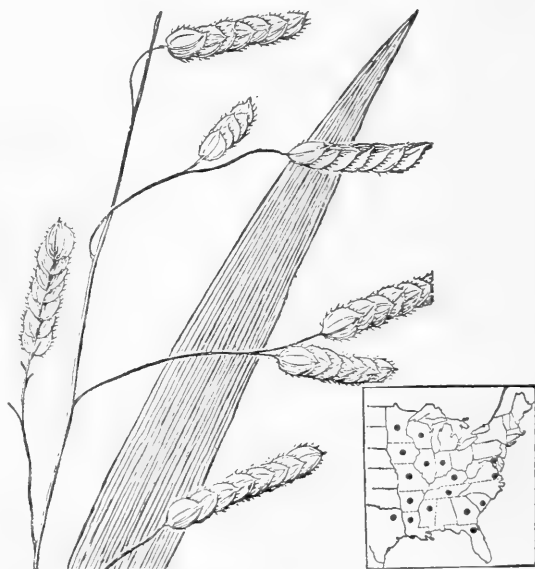


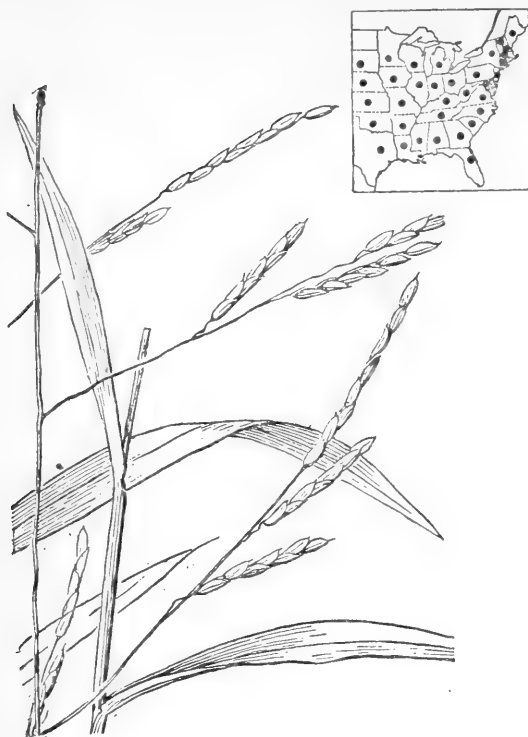
FIGURE 808.—*Leersia lenticularis*, × 1. (McDonald 68, Ill.)

amous. ♀ —Marshes, river banks, and wet places, often forming a zone around ponds and lakes, Quebec and Maine to British Columbia and eastern Washington south to northern Florida, Texas, Colorado, Arizona, and southeastern California; Europe. The late cleistogamous phase has been described as *L. oryzoides* forma *inclusa* (Wiesb.) Dörf.

3. *Leersia virginica* Willd. WHITE-GRASS. (Fig. 810.) Culms slender,



FIGURE 809.—*Leersia oryzoides*. Plant, $\times \frac{1}{2}$; spikelet, $\times 5$. (Hitchcock 5317, Tex.)

FIGURE 810.—*Leersia virginica*, $\times 1$. (French, Iowa.)

stiffly spreading, naked below, those of the branches smaller, sometimes included in the sheath; spikelets oblong, closely appressed to the branchlets, about 3 mm. long and 1 mm. wide, sparsely hispidulous, the keels short-hispid. 21 —Low woods and moist places, Quebec to South Dakota, south to Florida and Texas.

4. *Leersia hexandra* Swartz. (Fig. 811.) Culms slender, weak, usually long-decumbent from a creeping and rooting base, with slender rhizomes and extensively creeping leafy stolons; the flowering culms upright; blades rather stiff, 2 to 5 mm. wide; panicle

FIGURE 812.—*Leersia monandra*, $\times 1$. (Nealley, Tex.)FIGURE 811.—*Leersia hexandra*, $\times 1$. (Wurzelow, La.)

narrow, 5 to 10 cm. long, the branches ascending or appressed, floriferous nearly to the base; spikelets oblong, about 4 to 5 mm. long, a little more than 1 mm. wide, often purplish, sparsely hispidulous, the keels bristly ciliate. 21 —Shallow water, ditches, and wet places near the coast, Virginia to Florida and Texas; widely distributed in the tropics of both hemispheres.

5. *Leersia monandra* Swartz. (Fig. 812.) Culms tufted, erect, wiry, 50 to 100 cm. tall, without rhizomes; sheaths smooth or nearly so; blades elongate, 1 to 5 mm. wide; panicle open, the capillary solitary branches spreading, naked below, the small spikelets near the ends; spikelets pale, broadly ovate, glabrous, about

2 mm. long. 2 —Rocky woods Florida, and southern Texas; West and prairies, Florida Keys, southern Indies.

TRIBE 10. ZIZANIEAE

121. ZIZANIA L. WILDRICE

Spikelets unisexual, 1-flowered, disarticulating from the pedicel; glumes obsolete, represented by a small collarlike ridge; pistillate spikelet terete, angled at maturity; lemma chartaceous, 3-nerved, tapering into a long slender awn; palea 2-nerved, closely clasped by the lemma; grain cylindric, 1 to 2 cm. long; staminate spikelet soft; lemma 5-nerved, membranaceous, linear, acuminate or awn-pointed; palea about as long as the lemma, 3-nerved; stamens 6. Tall aquatic annuals or perennials, with flat blades and large terminal panicles, the lower branches ascending or spreading, bearing the pendulous staminate spikelets, the upper branches ascending, at maturity erect, bearing appressed pistillate spikelets, the staminate spikelets early deciduous, the pistillate spikelets tardily deciduous. Type species, *Zizania aquatica*. Name from *Zizanion*, an old Greek name for a weed growing in grain, the tares of the Scripture parable.

The seeds of wildrice were used by the aborigines for food and are still used to some extent by some of the northern tribes of Indians. Wildrice is important as a food and as shelter for waterfowl and is sometimes planted for this purpose in marshes on game preserves. The Chinese cultivate the Asiatic species, *Z. latifolia* (Griseb.) Turcz., as the source of a vegetable which they call *kau sun*. This consists of a thickened portion of the base of the culm, the point of incipient fruiting of a smut fungus, *Ustilago edulis*.

Plants annual, erect..... 1. *Z. AQUATICA*.
Plants perennial, long-decumbent at base..... 2. *Z. TEXANA*.

1. *Zizania aquatica* L. ANNUAL WILDRICE. (Fig. 813, B.) Annual; culms robust, usually 2 to 3 m. tall; blades elongate, 1 to 4 cm. wide, scaberulous; ligule 10 to 15 mm. long; panicles mostly 30 to 50 cm. long, the branches mostly 15 to 20 cm. long; lemma and palea of pistillate spikelet about 2 cm. long, thin, hispid throughout. ☉ —Marshes and borders of streams and ponds, usually in shallow water, Maine to Michigan and Illinois, south to Florida and Louisiana; Idaho.

ZIZANIA AQUATICA var. ANGUSTIFOLIA Hitchc. Culms usually not more than 1.5 m. tall; ligule 3 to 8 mm. long; blades usually not more than 1 cm. wide; lemma and palea of pistillate spikelet mostly larger, firm, shining, hispid only on the margin and nerves. ☉ —Shallow water, Quebec and New Brunswick

to North Dakota, south to New York and Nebraska.

ZIZANIA AQUATICA var. INTERIOR Fassett. (Fig. 813, A.) Closely resembling the species, or the blades narrower; pistillate spikelet as in var. *angustifolia*; intergrades in the Middle West. ☉ —Michigan and Indiana to North and South Dakota; Idaho.

2. *Zizania texana* Hitchc. TEXAS WILDRICE. (Fig. 814.) Perennial; culm long-decumbent and rooting at base, 1 to 3 m. long; blades elongate, 3 to 15 or even 20 mm. wide; panicle 20 to 30 cm. long, narrow, the lower (staminate) branches ascending, 5 to 10 cm. long; staminate spikelets 7 to 9 mm. long, 1.5 mm. wide; pistillate spikelets about 1 cm. long, tapering into an awn 1 to 2 cm. long. 2



FIGURE 813.—A, *Zizania aquatica* var. *interior*. Plant, $\times \frac{1}{2}$; pistillate spikelet, $\times 2$; second view, $\times 5$. (Fink, Iowa.) B, *Z. aquatica*. Pistillate spikelet, $\times 5$. (Hitchcock, Va.)

—Growing in rapidly flowing water, San Marcos, Tex. The grass grows in water 30 to 120 cm. deep, the lower part of the plant prostrate or floating on the water, the upper part erect. Flowers from April to November and at warm periods during winter. Said to be troublesome in irrigation ditches.

122. *ZIZANIOPSIS* Doell and Aschers.

Spikelets unisexual, 1-flowered, disarticulating from the pedicel, mixed on the same branches of the panicle, the staminate below; glumes wanting; lemma 7-nerved, short-awned in the pistillate spikelets; palea 3-nerved; staminate spikelets with 6 stamens; styles rather long, united; fruit obovate, free from the lemma and palea, coriaceous, smooth and shining, beaked with the persistent style; seed free from the pericarp. Robust perennial marsh grasses, with stout creeping rhizomes, broad flat blades, and large open panicles. Type species, *Zizaniopsis microstachya* (Nees) Doell and Aschers. Name from *Zizania*, a generic name, and Greek *opsis*, appearance, alluding to the similarity to *Zizania*.

1. *Zizaniopsis miliacea* (Michx.) Doell and Aschers. (Fig. 815.) SOUTHERN WILDRICE. Culms 1 to 3 m. tall or even taller; blades glabrous except the very scabrous margins, 1 to 2 cm. wide, the midrib stout; panicle rather narrow, nodding, 30 to 50 cm. long, the numerous branches fascicled, as much as 15 to 20 cm. long, naked at base; spikelets 6 to 8 mm. long, short-awned, the staminate slender, the pistillate turgid at maturity. 2 — Marshes, creeks, and river banks, Maryland to Kentucky and Oklahoma, south to Florida and Texas.

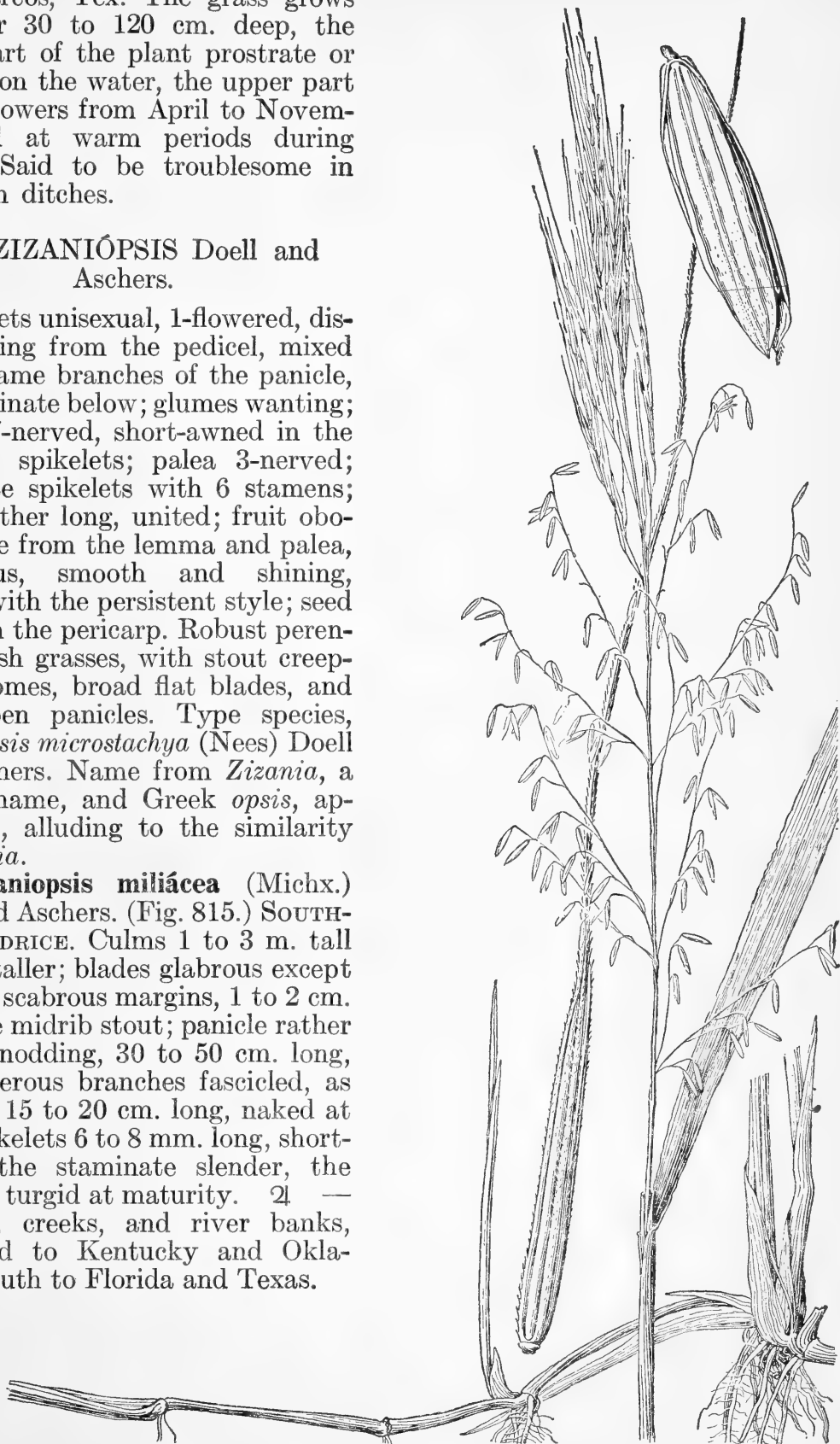


FIGURE 814.—*Zizania texana*. Plant, $\times \frac{1}{2}$; pistillate and staminate spikelets, $\times 5$. (Type.)

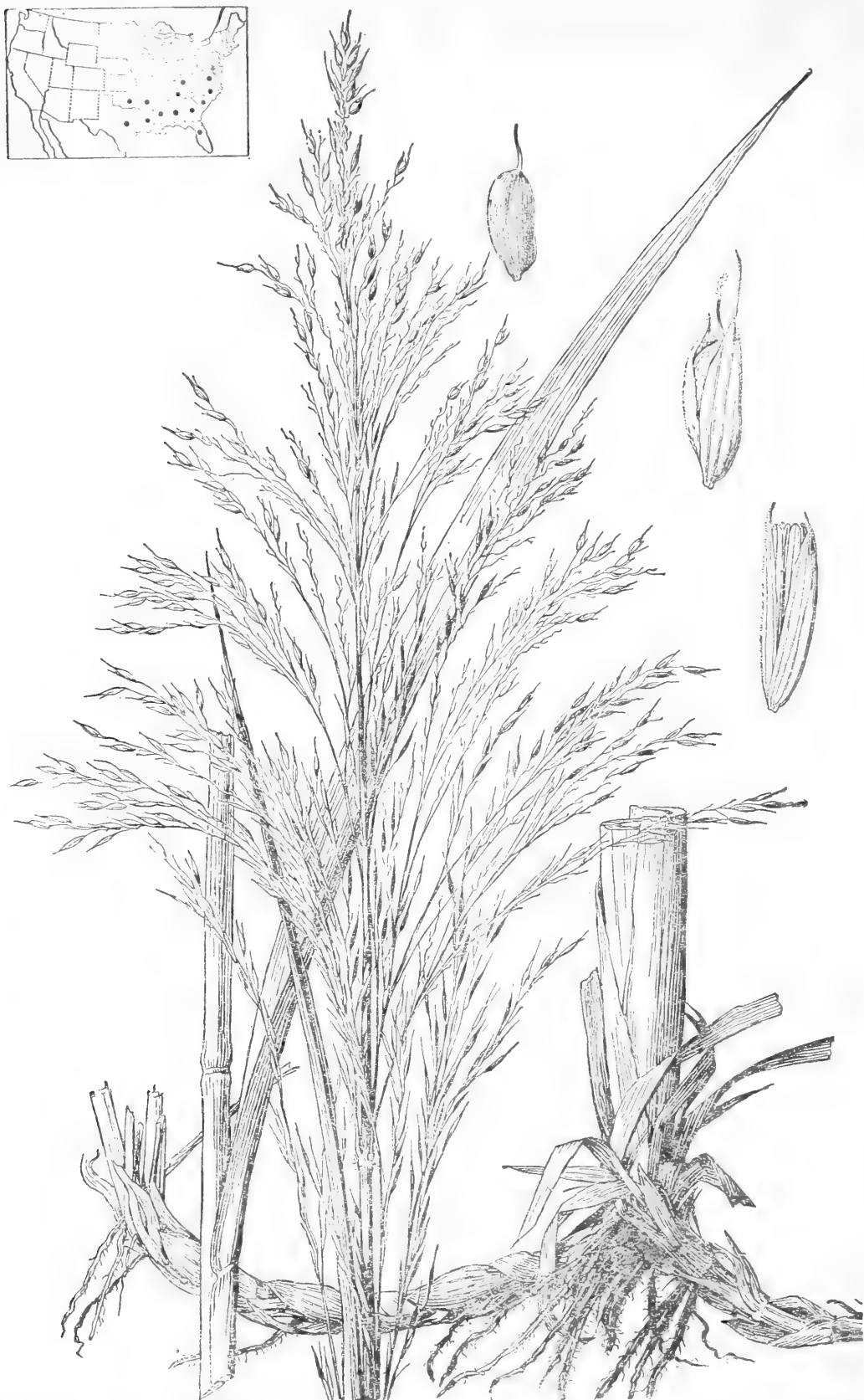


FIGURE 815.—*Zizaniopsis miliacea*. Plant, $\times \frac{1}{2}$; staminate spikelet, pistillate spikelet, and ripe caryopsis, $\times 5$.
(Chase 7121, S. C.)

123. LUZIOLA Juss.

Spikelets unisexual, 1-flowered, disarticulating from the pedicel, the staminate and pistillate spikelets in separate panicles on the same plant; glumes



FIGURE 816.—*Luziola peruviana*. Plant, $\times \frac{1}{2}$; pistillate and staminate spikelets, $\times 5$. (Curtiss 6871, Fla.)

wanting; lemma and palea about equal, thin, several to many-nerved, lanceolate or oblong; stamens 6 or more; stigmas long, plumose; grain free, globose, finely striate. Creeping, low or delicate perennials, with narrow flat blades and terminal and axillary panicles. Type species, *Luziola peruviana*. Name modified from *Luzula*, a genus of Juncaceae.

Pistillate spikelets ovoid, about 2 mm. long; staminate and pistillate panicles on the same shoot..... 1. *L. PERUVIANA*.

Pistillate spikelets oblong-lanceolate, 4 to 5 mm. long; staminate and pistillate panicles on different shoots..... 2. *L. BAHIENSIS*.

1. *Luziola peruviana* Gmel. (Fig. 816.) Culms slender, branching, the flowering shoots ascending, 10 to 40 cm. tall; blades 1 to 4 mm. wide, exceeding the panicles; staminate panicles terminal, narrow, the spikelets about 7 mm. long; pistillate panicles terminal and axillary, 3 to 6 cm. long, about as wide, the spikelets about 2 mm. long, ovoid at maturity, abruptly pointed. ♀ —Muddy ground and wet meadows, Florida (Pensacola) and Louisiana (vicinity of New Orleans); Mexico and Cuba, south to Argentina.

2. *Luziola bahiensis* (Steud.) Hitchc. (Fig. 817.) Extensively stoloniferous, the flowering shoots not more than 15 cm. tall, mostly less; blades 2 to 4 mm. wide, much exceeding the panicles; panicles mostly terminal, the staminate few-flowered, the spikelets about 5 mm. long; pistillate panicles 4 to 6 cm. long, the few stiff branches finally spreading, with a few appressed oblong-lanceolate spikelets 4 to 5 mm. long, the lemma and palea much exceeding the caryopsis. ♀ —Lagoons and banks of streams, southern Alabama; Cuba, Venezuela, Brazil.

124. *HYDRÓCHLOA* Beauv.

Spikelets unisexual, 1-flowered, disarticulating from the pedicel, the staminate and pistillate spikelets in separate panicles on the same plant; glumes wanting; staminate spikelets with a thin 7-nerved lemma, a 2-nerved palea, and 6 stamens; pistillate spikelets with a thin 7-nerved lemma and 5-nerved palea, the stigmas long and slender. A slender, branching, aquatic grass, probably



FIGURE 817.—*Luziola bahiensis*, $\times 1$. (Mohr, Ala.)

perennial, the leaves floating; staminate spikelets in small few-flowered terminal racemes; pistillate spikelets in few-flowered racemes in the axils of the leaves. Type species, *Hydrochloa caroliniensis*. Name from Greek *hudor*, water, and *chloa*, grass, alluding to the habitat.

1. *Hydrochloa caroliniensis* Beauv. (Fig. 818.) Culms up to 1 m. or more long, freely branching, leafy; blades flat, 1 to 3 cm. long, 1 to 2 mm. wide, in vigorous shoots as much as 6 cm. long and 5 mm. wide; spikelets inconspicuous and infrequent, the staminate about 4 mm. long, the pistillate about 2 mm. ♀ —Ponds and slow-flowing streams, sometimes in sufficient abundance to become troublesome. North Carolina to Florida and Louisiana. Eaten by livestock. Lemma 5- or 7-nerved; palea 4- to 7-nerved. (Weatherwax.)

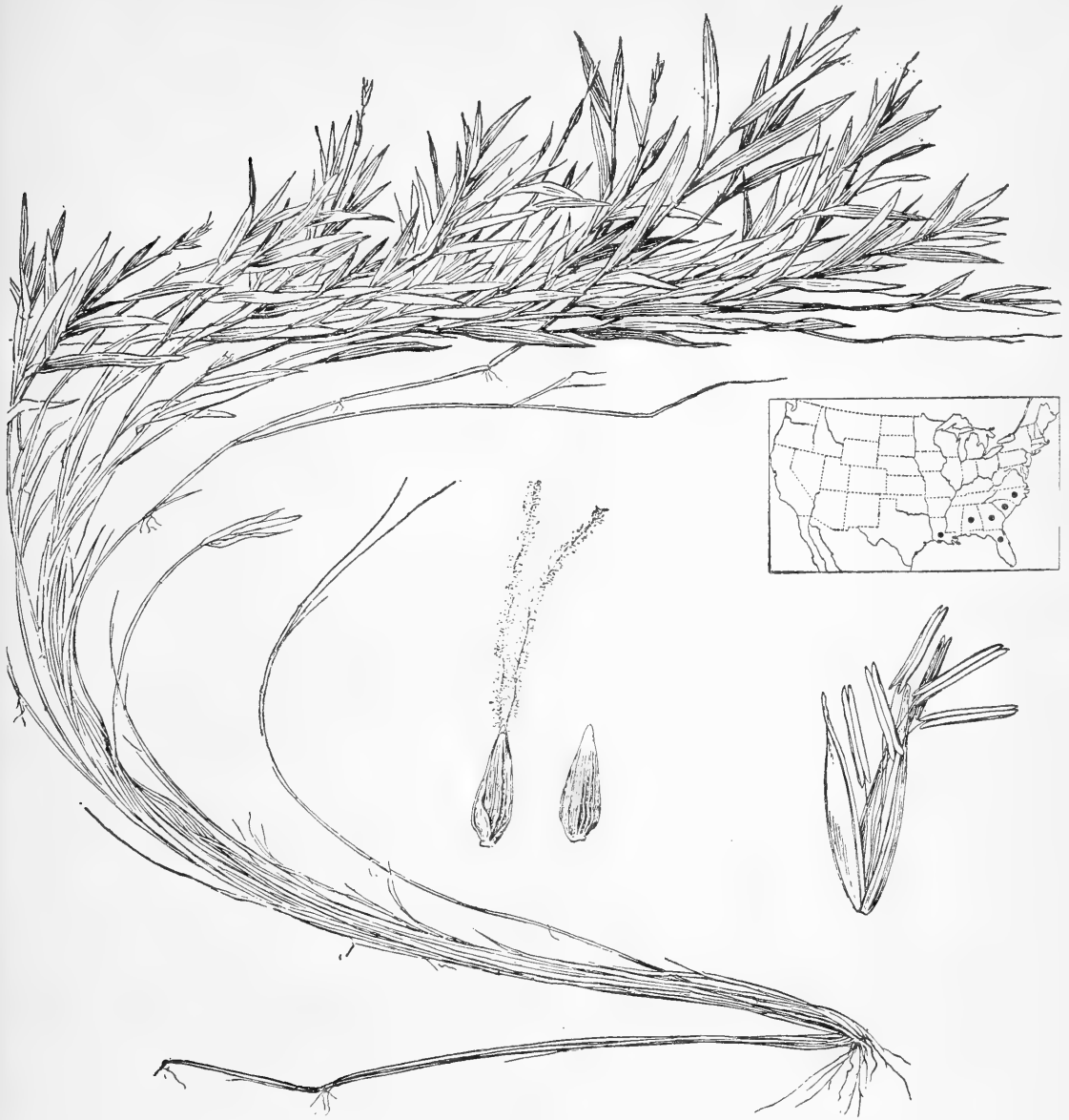


FIGURE 8 18.—*Hydrochloa caroliniensis*. Plant, $\times \frac{1}{2}$; two views of pistillate spikelet and staminate spikelet, $\times 5$. (Nash 1152, Fla.)

125. PHÁRUS L.

Spikelets in pairs, appressed along the slender spreading, nearly simple panicle branches, one pistillate, subsessile, the other staminate, pediceled, much smaller than the pistillate spikelet; fertile lemma subindurate, terete, clothed, at least toward the beaked apex, with thick uncinete hairs; blades petioled (the petiole with a single twist reversing the upper and under surfaces of the blade), the nerves running from midnerve to margin, with fine transverse veins be-

tween the nerves. Perennials with broad flat elliptic or oblanceolate blades and terminal panicles with rather few stiffly spreading branches breaking readily at maturity, the terete pistillate spikelets appressed, the uncinete fruits acting like burs. Type species, *Pharus latifolius* L. Name from Greek *pharos*, cloth or mantle, possibly alluding to the broad blades.

1. *Pharus parvifolius* Nash. (Fig. 819.) Culms long-decumbent and rooting at base, the flowering shoot 30 to 50 cm. tall; blades elliptic,



FIGURE 819.—*Pharus parvifolius*, $\times \frac{1}{2}$. (Miller 1231, Dominican Republic.)

abruptly acuminate, 10 to 20 cm. long, 2 to 4 cm. wide; panicles mostly 10 to 20 cm. long, about as wide; pistillate spikelets about 1 cm. long, the glumes thin, brown, less than half as long as the lemma; staminate spikelets about 3 mm. long, the slender pedicels appressed to the pistillate spikelets. ♀ —Rocky woods, Florida, rare (Pineola; Orange Lake); West Indies to Brazil.

TRIBE 11. MELINIDEAE

126. MELÍNIS Beauv.

Spikelets small, dorsally compressed, 1-flowered with a sterile lemma below the fertile floret, the rachilla disarticulating below the glumes; first glume minute; second glume and sterile lemma similar, membranaceous, strongly nerved, slightly exceeding the fertile floret; fertile lemma and palea subhyaline toward summit. Perennials with slender, branching, decumbent culms and narrow many-flowered panicles, with capillary branchlets and pedicels. Type species, *Melinis minutiflora*. Name from Greek *meline*, millet.

1. *Melinis minutiflora* Beauv. MOLASSES GRASS. (Fig. 820.) Culms ascending from a tangled much-branched base, as much as 1 m. tall; the foliage viscid-pubescent; blades flat, 5 to 15 cm. long, 5 to 10 mm. wide; panicle 10 to 20 cm. long, purplish; spikelets about 2 mm. long; sterile lemma 2-lobed, with a delicate awn 1 to 10 mm. long from between the lobes. ♀ —Introduced from Brazil, though native of Africa. Cultivated for forage and spreading in open ground through Central and South America and the West Indies. It has been tried successfully in south-



FIGURE 820.—*Melinis minutiflora*. Plant, $\times 1$; spikelet, $\times 10$. (Moldenke 453, Fla.)

ern Florida. The grass has a heavy sweetish odor when fresh. Called in Brazil *capím gordura*.

THYSANOLAÉNA MÁXIMA (Roxb.) Kuntze. Robust perennial, 1 to 3 m. tall; blades 3 to 7 cm. wide; panicle commonly 1 m. long, the slender flat densely flowered branches drooping; spikelets about 2 mm. long, pointed; fertile lemma long-ciliate. ♀ —Introduced in southern Florida and southern California as an ornamental.

TRIBE 12. PANICEAE

127. ANTHAENÁNTIA Beauv.

Spikelets obovoid; first glume wanting; second glume and sterile lemma about equal, 5-nerved, the broad internerves infolded, densely villous, the sterile lemma with a small palea and sometimes with a staminate flower; fertile lemma cartilaginous, brown, with narrow pale hyaline margins, boat-

shaped, 3-nerved, subacute. Erect perennials with short creeping rhizomes, narrow, firm, flat blades, the uppermost much reduced, and narrow panicles, the slender branches ascending or appressed. Type species, *Anthaenantia villosa*. Name from Greek *anthos*, flower, and *enantios* contrary. (Beauvois misinterpreted the structure of the spikelet.)

In pine barrens *A. rufa* may be an important element in the natural pasture.

- Blades erect or spreading, rather blunt or rounded at the apex, linear, folded at base; panicle usually purple..... 1. *A. RUFA*.
 Blades ascending or spreading (on the average shorter and broader than in *A. rufa*), tapering to the apex, rounded at base; panicle usually pale..... 2. *A. VILLOSA*.

1. *Anthaenantia rufa* (Ell.) Schult. (Fig. 821.) Culms slender, 60 to 120 cm. tall; blades elongate, 3 to 5 mm. wide, often scabrous; panicle 8 to 15 cm. long, usually purple; spikelets 3 to 4 mm. long. ♀ —Moist pine barrens, Coastal Plain, North Carolina to Florida and eastern Texas.

2. *Anthaenantia villosa* (Michx.) Beauv. (Fig. 822.) Differing from *A. rufa* in the wider, mostly shorter, spreading blades and in the usually pale panicles. ♀ —Dry pine barrens, Coastal Plain, North Carolina to Florida and Texas.



FIGURE 821.—*Anthaenantia rufa*, × 1. (Amer. Gr. Natl. Herb. 290, N. C.)

128. TRICHÁCHNE Nees

(*Valota* Adans., inadequately published)

Spikelets lanceolate, in pairs, short-pedicel, in 2 rows along one side of a slender rachis; first glume minute, glabrous; second glume and sterile lemma about as long as the fruit, 3- to 5-nerved, copiously silky; fertile lemma cartilaginous, lanceolate, acuminate, usually brown, the flat white hyaline margins broad. Perennials with slender erect or ascending racemes, approximate to rather distant along a slender main axis, forming a white to brownish silky panicle. Type species, *Trichachne insularis*. Name from Greek *thrix* (*trich*-), hair, and *achne*, chaff, alluding to the silky spikelets.

Trichachne insularis is not relished by cattle, hence the name sourgrass by which it is called in the West Indies; *T. californica* is a constituent of the ranges of the Southwest, and furnishes fair forage.

- Fruit 4 mm. long; spikelets tawny-villous..... 1. *T. INSULARIS*.
 Fruit 3 mm. or less long (rarely 3.5 mm.); spikelets white-villous.
 Spikelets long-silky, the hairs exceeding the spikelet; fruit 3 to 3.5 mm. long.
 Panicle branches stiffly ascending or spreading, comparatively few-flowered; fruit oblong-lanceolate, gradually pointed..... 3. *T. PATENS*.
 Panicle branches appressed, densely flowered; fruit obovate, abruptly pointed, the point scarcely indurate..... 2. *T. CALIFORNICA*.
 Spikelets short-silky, the hairs not exceeding the spikelet; fruit 2.4 mm. long. 4. *T. HITCHCOCKII*.

1. *Trichachne insularis* (L.) Nees. SOURGRASS. (Fig. 823.) Culms sub-erect from a hard scaly hairy swollen

base, 1 to 1.5 m. tall; leaves numerous; the sheaths sparsely hirsute;



FIGURE 822.—*Anthaenantia villosa*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 10$. (Chase 4605, N. C.)

blades elongate, 8 to 15 mm. wide; panicle 15 to 30 cm. long, the slender racemes mostly 10 to 15 cm. long, somewhat nodding; spikelets approximate, excluding the hairs about 4 mm. long, the tawny hairs much exceeding

them. 2 —Low open ground and waste places, Florida, Alabama (Mobile), southern Texas, and southern Arizona; Mexico; West Indies to Argentina.



FIGURE 823.—*Trichachne insularis*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 10$. (Baker and Wilson 602, Cuba)

2. *Trichachne californica* (Benth.) Chase. COTTONTOP. (Fig. 824.) Culms erect from a knotty swollen felty-pubescent base, 40 to 100 cm. tall; leaves numerous, the sheaths glabrous to sparsely pilose; blades mostly less than 12 cm. long, 3 to 5 mm. wide, from nearly glabrous to densely puberulent; panicle mostly 5 to 10 cm. long, the few racemes usually 3 to 5 cm. long, occasionally longer, erect or nearly so; spikelets approximate, excluding the hairs 3 to 4 mm. long, the white to purplish hairs much exceeding them, often spreading, the middle internerves of the sterile lemma glabrous. ♀ (*T. saccharata* Nash.)—Plains and dry open ground, Texas and Oklahoma to Colorado, Arizona, and Mexico; South America.

3. *Trichachne pátens* Swallen. (Fig. 825.) Culms tufted, erect, 40 to 90 cm. tall; sheaths more or less papillose-pilose, the lowermost densely felty-pubescent; blades 5 to 15 cm. long, 1 to 4 mm. wide, scabrous; panicle 10 to 18 cm. long, the racemes stiffly ascending or spreading; spikelets remote, 4 mm. long, densely silky, the hairs exceeding the spikelet; fruit 3 mm. long, acute. ♀ —Dry fields, prairies, and roadsides, Texas.

4. *Trichachne hitchcockii* (Chase) Chase. (Fig. 826.) Culms tufted and branching at base, leafy below, slender, 30 to 50 cm. tall; sheaths and



FIGURE 824.—*Trichachne californica*, $\times 1$. (Hitchcock 13608, Tex.)

blades nearly glabrous to puberulent, sometimes densely so toward base, the blades 2 to 5 cm. long, 2 to 3 mm. wide; panicle long-exserted, 6 to 10 cm. long, the few racemes 3 to 4 cm. long, mostly rather remote and erect; spikelets 2.5 to 3 mm. long, densely silky-villous, the prominent nerves not hidden, the grayish hairs not exceeding the spikelet. ♀ —Dry plains, Texas; northern Mexico.

129. DIGITÁRIA Heister. CRABGRASS

(*Syntherisma* Walt.)

Spikelets in twos or threes, rarely solitary, subsessile or short-pediceled, alternate in 2 rows on one side of a 3-angled winged or wingless rachis; spikelets lanceolate or elliptic, nearly planoconvex; first glume minute or wanting; second glume equaling the sterile lemma or shorter; fertile lemma cartilaginous, the hyaline margins pale. Annual or perennial, erect to prostrate, often weedy grasses, the slender racemes digitate or approximate on a short axis. Type species, *Digitaria sanguinalis*. Name from Latin *digitus*, finger, alluding to the digitate inflorescence of the type species.

The species are in the main good forage grasses. *Digitaria sanguinalis*, the common crabgrass, is a weed in cultivated soil. In the Southern States, where it produces an abundant growth in late summer on fields from which crops have been gathered, it is utilized for forage and is sometimes cut for hay. This species and *D. ischaemum* are common weeds in lawns. They form a fine green growth at first but start late and die in the fall.



FIGURE 825.—*Trichachne patens*. Plant, $\times 1$; spikelet and floret, $\times 10$. (Reed 11, Tex.)

- 1a. Rachis winged or flat-margined, the margin as wide as the central rib; plants annual, creeping at least at base.
 Rachis bearing scattered long fine hairs (these rarely wanting); spikelets narrow, acuminate, nearly glabrous..... 2. *D. HORIZONTALIS*.
 Rachis not bearing hairs; spikelets elliptic, acute, pubescent.
 Plants perennial, stoloniferous..... 7. *D. LONGIFLORA*.
 Plants annual. Culms erect or decumbent spreading.
 Sheaths glabrous; fertile lemma brown.
 Spikelets 2 mm. long, 1 mm. wide, the hairs or most of them capitellate.
 3. *D. ISCHAEMUM*.
 Spikelets 1.5 to 1.7 mm. long, about 0.6 mm. wide, the hairs not capitellate.
 Sterile lemma with 5 distinct nerves; spikelets sparingly pubescent, 1.7 mm. long; fertile lemma light brown; racemes, if more than 2, not digitate.
 4. *D. FLORIDANA*.
 Sterile lemma with 3 distinct nerves; spikelets distinctly pubescent, 1.5 mm. long, fertile lemma dark brown, racemes usually all digitate.
 5. *D. VIOLASCENS*.
 Sheaths pilose or villous; fertile lemma pale.
 Spikelets 1.5 to 1.7 mm. long; pedicels terete, glabrous..... 6. *D. SEROTINA*.
 Spikelets 2.5 to 3.5 mm. long; pedicels angled, scabrous..... 1. *D. SANGUINALIS*.
- 1b. Rachis wingless or with a very narrow margin (see also *D. horizontalis*), triangular; plants not creeping (except in *D. texana*), annual or perennial.
- 2a. Fertile lemma pale or gray.
 Plants annual, decumbent and rooting at base. Spikelets 3 mm. long, glabrous or nearly so..... 8. *D. SIMPSONI*.
 Plants perennial.
 Spikelets densely or sparsely villous; racemes 5 to 10.
 Spikelets 2.8 to 3.5 mm. long, sparsely to densely villous..... 14. *D. RUNYONI*.
 Spikelets 2 to 2.5 mm. long, rather sparsely villous..... 13. *D. TEXANA*.
 Spikelets glabrous to obscurely appressed-pubescent on the internerves; racemes 2 to 5, some of them naked at base for 1 to 1.5 cm.
 First glume broad, hyaline, minute but obvious; spikelets 3.2 mm. long, glabrous.
 15. *D. PAUCIFLORA*.
 First glume obsolete or nearly so; spikelets 2.5 to 2.8 mm. long, obscurely to obviously appressed-pubescent.
 Racemes 2 to 4; culms ascending from a curved base; sheaths papillose-pilose.
 16. *D. SUBCALVA*.
 Racemes 5 to 10; culms erect; sheaths conspicuously villous.
 17. *D. ALBICOMA*.
- 2b. Fertile lemma dark brown. Plants erect or at least not rooting at the decumbent base; annual or sometimes apparently perennial.
 Second glume and sterile lemma glabrous (see also *D. laeviglumis* under *D. filiformis*).
 12. *D. GRACILLIMA*.
 Second glume and sterile lemma capitellate-pubescent.
 Spikelets 2 to 2.5 mm. long..... 10. *D. VILLOSA*.
 Spikelets 1.5 to 1.7 mm. long.
 Blades folded or involute, flexuous..... 11. *D. DOLICHOPHYLLA*.
 Blades flat..... 9. *D. FILIFORMIS*.

1. *Digitaria sanguinalis* (L.) Scop.

CRABGRASS. (Fig. 827.) Plant branching and spreading, often purplish, rooting at the decumbent base, the culms sometimes as much as 1 m. long, the flowering shoots ascending; sheaths, at least the lower, papillose-pilose; blades 5 to 10 mm. wide, pubescent to scaberulous; racemes few to several, 5 to 15 cm. long, rarely longer, digitate, with usually 1 or 2 whorls a short distance below; spikelets about 3 mm. long; first glume minute but evident; second glume about half as long as the spikelet, nar-

row, ciliate; sterile lemma strongly nerved, the lateral internerves appressed-pubescent, the hairs sometimes spreading at maturity (*D. fimbriata* Link); fertile lemma pale. ☉
 —Fields, gardens, and waste places, a troublesome weed in lawns and cultivated ground throughout the United States at low and medium altitudes, more common in the East and South; temperate and tropical regions of the world. Native of Europe. A specimen with nearly glabrous sheaths and inflorescences of 2 racemes collected by



FIGURE 826.—*Trichachne hitchcockii*. Plant, $\times 1$; spikelet and floret, $\times 10$. (Type.)

Tracy in Mississippi, said to be introduced, has been erroneously referred to *Syntherisma barbatum* (Willd.) Nash (*Digitaria barbata* Willd.).

DIGITARIA SANGUINALIS var. *CILIÁRIS* (Retz.) Parl. Sterile lemma, pectinate-ciliate, the stiff cilia 1.5 mm. long. Along railroad, Berks County, Pa. Waif from Asia.

2. *Digitaria horizontális* Willd. (Fig. 828.) Resembling *D. sanguinalis*, the culms more slender, the racemes mostly subracemose, very slender, lax, the rachis scarcely winged, bearing scattered long fine spreading hairs (these rarely wanting); spikelets narrow, about 2 mm. long; first glume minute or obsolete; second glume half as long as the spikelet. ☉ (*Syntherisma setosum* Nash; *S. digitatum* Hitchc.)—Waste places, southern and central Florida; ballast, Mobile, Ala.; tropical regions of North America and South America.

3. *Digitaria ischaémum* (Schreb.) Schreb. ex Muhl. SMOOTH CRABGRASS.

(Fig. 829.) Erect or usually soon decumbent-spreading, resembling *D. sanguinalis* but not so coarse or tall; foliage glabrous, bluish or purplish; racemes mostly 2 to 6, 4 to 10 cm. long, the rachis with thin wings wider than the midrib; spikelets about 2 mm. long; first glume hyaline, obscure; second glume and sterile lemma as long as the dark fertile lemma, pubescent with capitellate hairs. ☉ (*Syntherisma humifusum* Rydb.)—Waste places, often a troublesome weed in lawns. Quebec to Georgia, west to Washington and California; introduced from Eurasia. The first glume is so thin as to be apparently wanting. *DIGITARIA ISCHAEMUM* var. *MISSISSIPPIÉNSIS* (Gattinger) Fernald. Taller, the racemes mostly 5 to 7, often 10 or even 15 cm. long; first glume often more easily seen. ☉ —Maryland, Indiana, Illinois, Virginia, Tennessee, South Carolina, and Georgia.

4. *Digitaria floridána* Hitchc. (Fig. 830.) Culms tufted, decumbent at base, 20 to 30 cm. tall; foliage glabrous except for a few long hairs around the mouth of the sheath; blades 4 to 7 cm. long, 3 to 6 mm. wide; racemes 3 or 4, rather distant on the axis, 3 to 6 cm. long, the rachis wings wider than the midrib; spikelets 1.5 to 1.7 mm. long, rather sparingly pubescent; first glume wanting; second glume and sterile lemma about as long as the light-brown fertile lemma. ☉ —Sandy pine woods, Florida (Hernando County). The inflorescence resembles that of *D. filiformis*, but the rachis is winged; the spikelets are smaller than those of *D. ischaemum*.

5. *Digitaria violáscens* Link. (Fig. 831.) Annual or apparently perennial; culms numerous in a tuft, spreading at base, slender, 10 to 40 cm. tall; leaves mostly clustered near the base, the sheaths glabrous; blades flat, mostly less than 5 cm. long, 3 to 6 mm. wide, the upper culm blade distant, reduced; racemes slender, 2 to 5, usually 2 or 3, digitate or some-

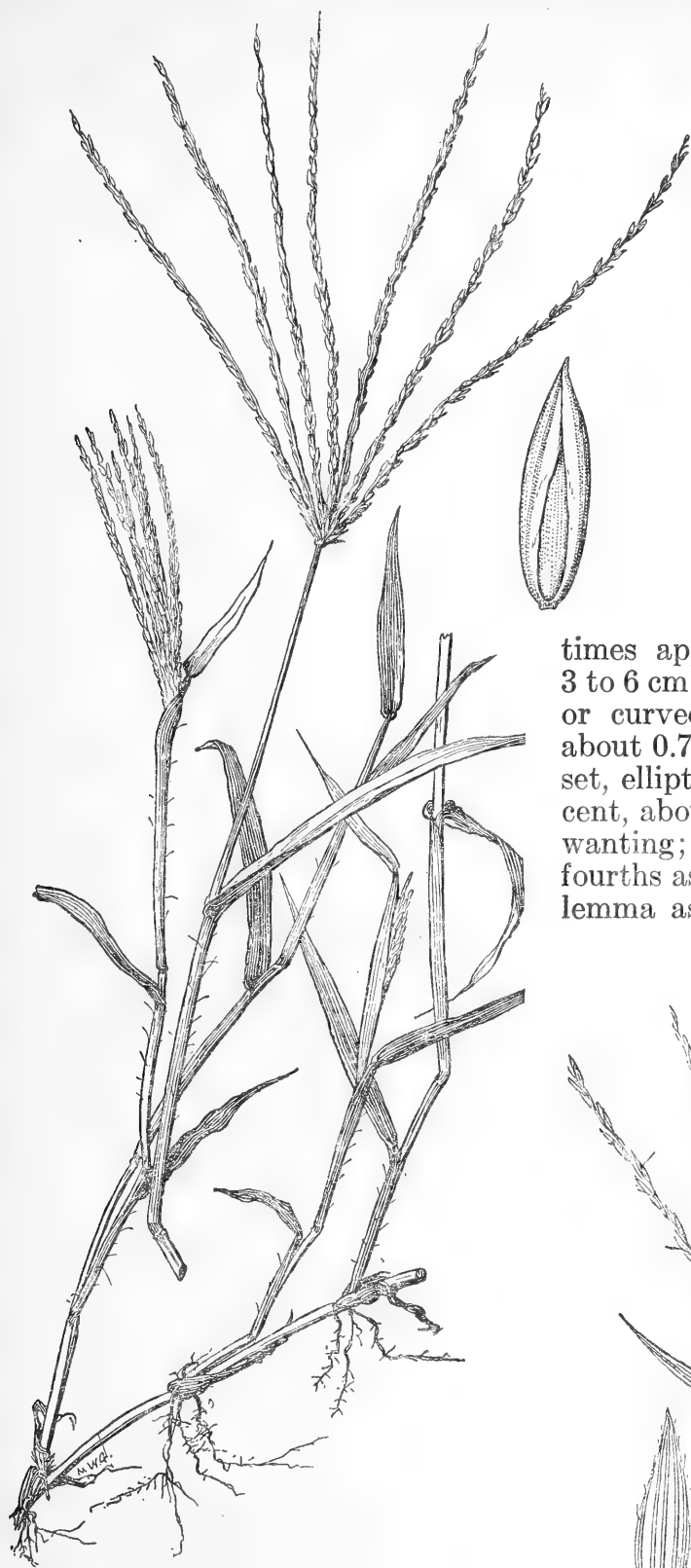


FIGURE 827.—*Digitaria sanguinalis*. Plant, $\times \frac{1}{2}$; two views of spikelet, and floret, $\times 10$. (Norton 566, Kans.)

times approximate on a short axis 3 to 6 cm. long, at maturity spreading or curved, the rachis flat, winged, about 0.7 mm. wide; spikelets closely set, elliptic, acutish, minutely pubescent, about 1.5 mm. long; first glume wanting; second glume about three fourths as long as the spikelet; sterile lemma as long as the spikelet, with



FIGURE 828.—*Digitaria horizontalis*. Plant, $\times 1$; spikelet and floret, $\times 10$. (Nash 996, Fla.)



FIGURE 829.—*Digitaria ischaemum*. Plant, $\times 1$; spikelet and floret, $\times 10$. (Jones 1761, Vt.)



FIGURE 830.—*Digitaria floridana*. Plant, $\times 1$; spikelet and fertile floret, $\times 10$. (Type.)

three distinct nerves and 1 or 2 obscure pairs; fertile lemma acute, dark brown at maturity. ☉ 2 —Open pineland in sandy soil, Indiana and Kentucky; Georgia and Florida to Arkansas and Texas; tropical America; tropical Asia.

6. *Digitaria serótina* (Walt.) Michx. (Fig. 832.) Creeping, sometimes forming extensive mats; flowering culms ascending or erect, 10 to 30 cm. tall; leaves crowded on the creeping culms, the blades short; sheaths villous; blades 2 to 8 cm. long, 3 to 7 mm. wide; racemes usually 3 to 5, slender, often arcuate, 3 to 10 cm. long, the rachis with thin wings wider than the midrib; spikelets pale, about 1.7 mm. long; first glume wanting; second glume about one-third as long as the sterile lemma, both finely pubescent; fertile lemma pale. ☉ —Pastures and waste places, Coastal Plain, Pennsylvania to Florida and Louisiana; Philadelphia (ballast); Cuba.

7. *Digitaria longiflora* (Retz.) Pers. (Fig. 833.) Stoloniferous; culms ascending, 20 to 40 cm. tall, glabrous; sheaths glabrous; ligule membranaceous, 1 mm. long; blades 1 to 4 cm. long, 3 to 5 mm. wide, flat, glabrous; racemes 2 to 4, 3 to 8 cm. long, usually curved, the rachis flat, 0.5 to 0.8 mm. wide; spikelets 1.5 mm. long, elliptic, minutely pubescent. 2 —Ditches and sandy ground, southern Florida; tropical regions of the Old World; introduced in the American Tropics.

8. *Digitaria simpsoni* (Vasey) Fernald. (Fig. 834.) Resembling *D. sanguinalis* in habit; sheaths papillosepilose, those of the innovations compressed-keeled; blades not more than 6 mm. wide, softly pilose; racemes 4 to 8, ascending, pale, 8 to 12 cm. long, the triangular rachis narrowly margined; spikelets about 3 mm. long; first glume hyaline, obsolete or nearly so; second glume and sterile lemma finely 7- to 9-nerved, glabrous

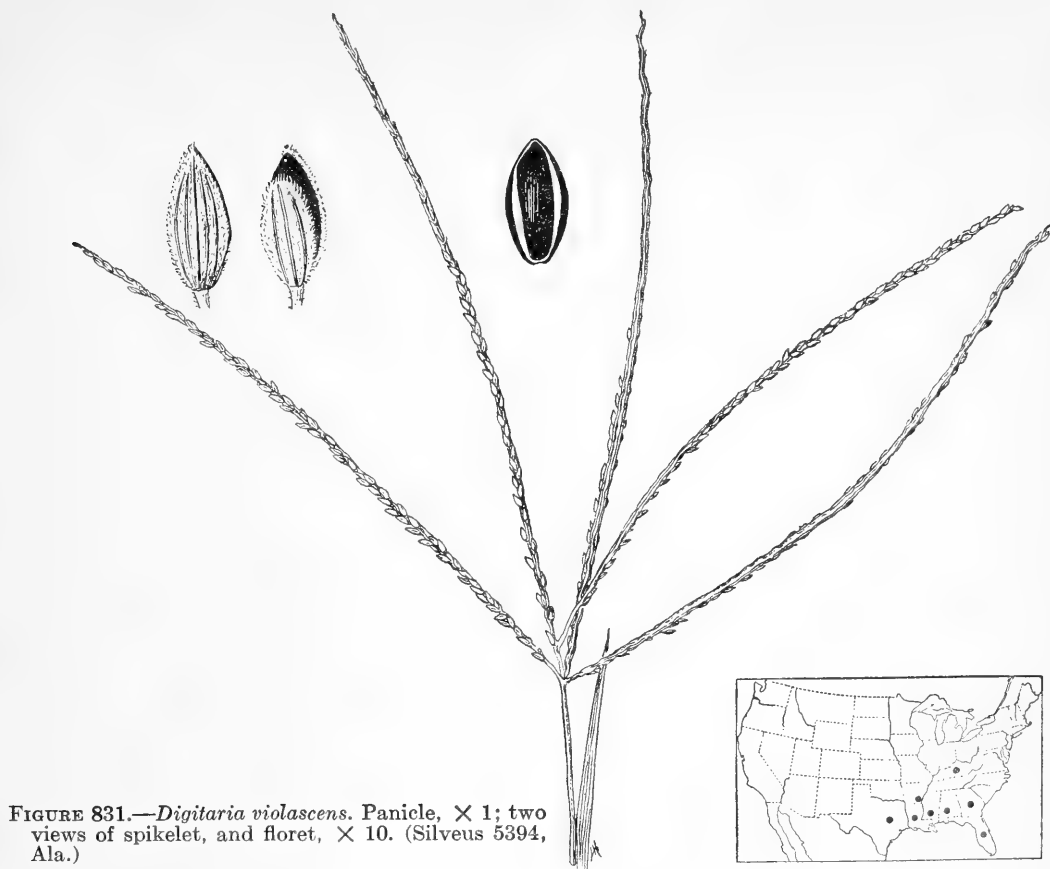


FIGURE 831.—*Digitaria violascens*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Silveus 5394, Ala.)

or very obscurely pubescent, barely exceeding the pale, slightly apiculate fertile lemma. \odot —Sandy fields, Florida, rare; Isla de Pinos, Cuba.

9. *Digitaria filifórmis* (L.) Koel. (Fig. 835, A.) Culms in small tufts, slender, usually erect, 10 to 60 cm. tall, rarely taller, those of a tuft very unequal; lower sheaths pilose, the upper mostly glabrous; blades erect, usually 5 to 15 cm. long (longer in more robust plants), 1 to 4 mm. wide; racemes mostly 1 to 5, unequal, erect or ascending, mostly less than 10 cm. long, somewhat distant, not fasciated; spikelets 1.5 to 1.7 mm. long; first glume wanting; second glume and sterile lemma pubescent with short capitellate hairs, sometimes nearly glabrous, the glume shorter than the spikelet; fertile lemma dark brown, slightly apiculate. \odot —Sandy fields and sterile open ground, New Hampshire to Iowa and Oklahoma, south to Florida, Texas, and Mexico. A form with

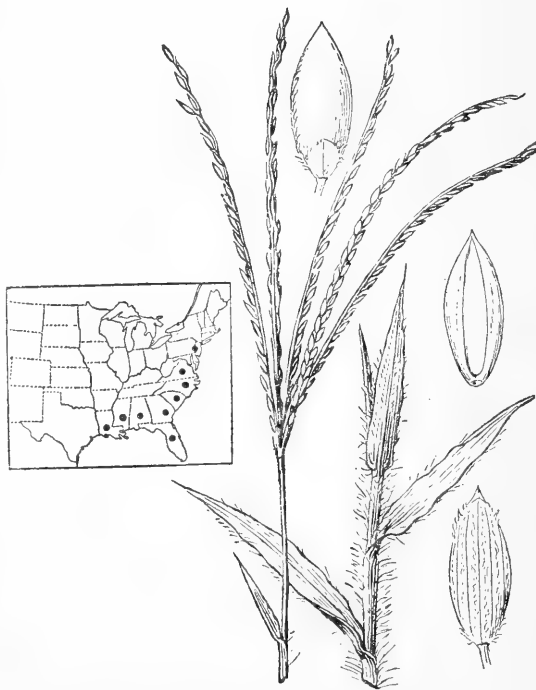


FIGURE 832.—*Digitaria serotina*. Plant, $\times 1$; two views of spikelet, and floret, $\times 10$. (Tracy 4653, Miss.)

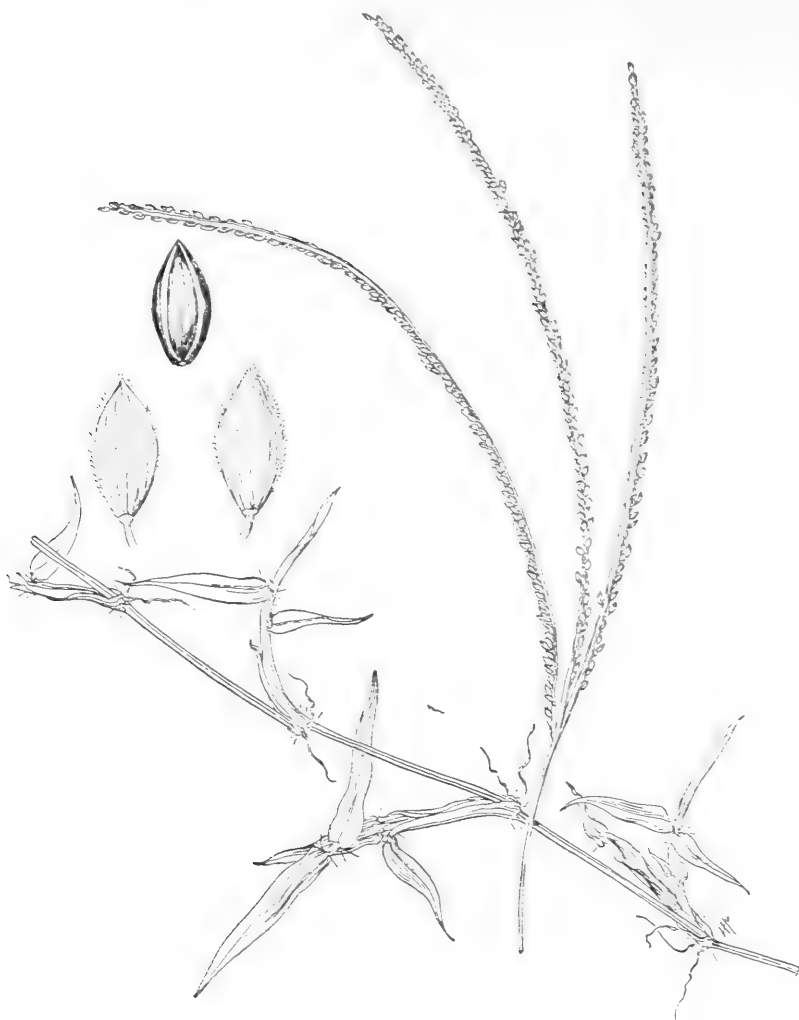


FIGURE 833.—*Digitaria longiflora*, Plant, $\times \frac{1}{2}$. Stolon and panicle, $\times 1$; spikelet and floret, $\times 10$. (Silveus 4405, Fla.)

glabrous spikelets from Manchester, N. H., has been described as *D. laeviglumis* Fernald (835, B.).

10. *Digitaria villósa* (Walt.) Pers. (Fig. 836.) Perennial at least in the Southern States, in large tufts, purplish at base; culms 0.75 to 1.5 m. tall, rarely branching; sheaths, at least the lower, grayish villous, sometimes sparsely so; blades elongate, 3 to 6 mm. wide, often flexuous, from softly pilose to nearly glabrous; racemes 2 to 7, narrowly ascending, rarely somewhat spreading, very slender, usually 15 to 25 cm. long, rather distant, often naked at base, sometimes interrupted; spikelets 2 to 2.5 mm. long, usually densely pubescent with soft capitellate hairs, the hairs longer than in *D. filiformis*, and some-

times only obscurely capitellate, the spikelets otherwise very like those of *D. filiformis*. 2 —Sandy fields and woods, Maryland to Missouri, south to Florida and Texas; Cuba, Mexico. This species and *D. filiformis* seem to intergrade to some extent. Plants from peninsular Florida with less strongly pubescent sheaths, 2 to 4 elongate racemes, and spikelets with longer hairs have been distinguished as *D. leucocoma* (Nash) Urban.

11. *Digitaria dolichophýlla* Henr. (Fig. 837.) Slender wiry perennial, 50 to 115 cm. tall; blades elongate, folded or involute, flexuous, about 1 mm. wide; racemes mostly 1 to 3, erect, 5 to 20 cm. long, usually 10 to 20 cm., very slender, loosely flowered; spikelets about 1.5 mm.

long, the capitate hairs rather stiff and appressed; fruit dark brown. 2 (Has been confused with *D. panicea* (Swartz) Urban.)—Moist pine barrens and open ground, southern Florida; Cuba, Puerto Rico.

12. *Digitaria gracillima* (Scribn.) Fernald. (Fig. 838.) Perennial in dense tufts; culms 60 to 100 cm. tall, erect; lower sheaths appressed-villous; blades elongate, 1 to 2 mm. wide,

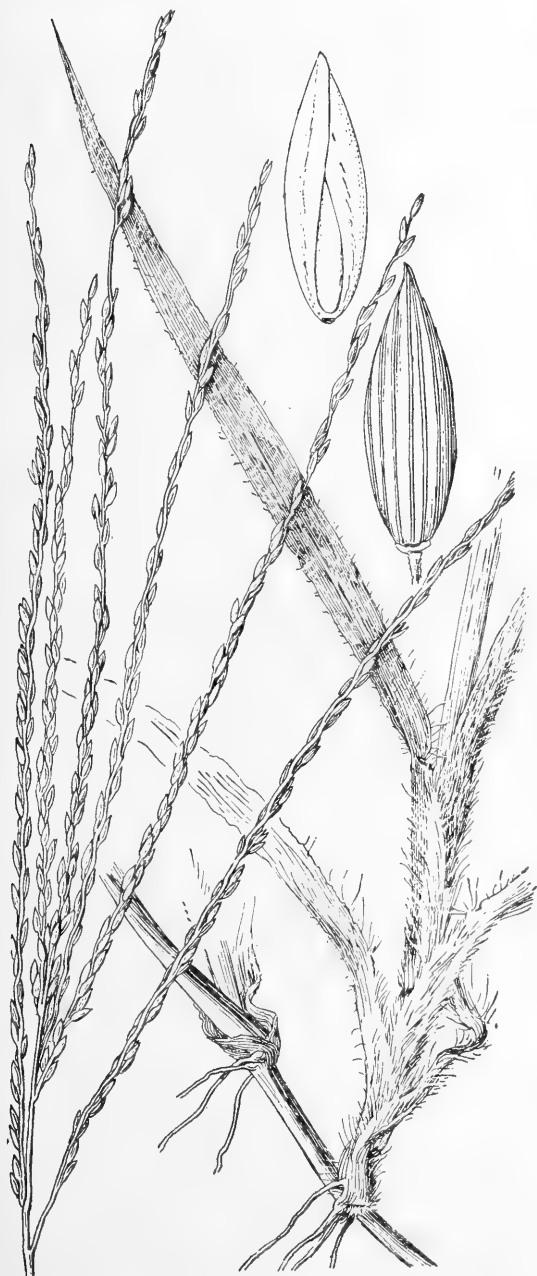


FIGURE 834.—*Digitaria simpsoni*. Plant, $\times 1$; spikelet and floret, $\times 10$. (Curtiss 6422, Fla.)



FIGURE 835.—A, *Digitaria filiformis*. Plant, $\times 1$; spikelet and floret, $\times 10$. (Bissell, Conn.) B, *D. laeviglumis*. Spikelet, $\times 10$. (Type coll.)



often involute, more or less flexuous; racemes mostly 2 or 3, distant (rarely as many as 5 and fairly approximate), very slender; spikelets rather remote, relatively long pediceled, about 2.3 mm. long, glabrous; first glume ob-



FIGURE 836.—*Digitaria villosa*. Plant, $\times 1$; spikelet and floret, $\times 10$. (Curtiss 5300, Fla.)



FIGURE 837.—*Digitaria dolichophylla*. Plant, $\times 1$; spikelet and floret, $\times 10$. (Tracy 9058, Fla.)

solete, the second one-fourth to half as long as the dark-brown fertile lemma; sterile lemma scarcely equaling the fruit. 2 —Sandy soil, high pineland, peninsular Florida, rare. A tall plant from Grasmere with 3 to 5 racemes, the spikelets having second glumes about two-thirds as long as the fertile lemma, has been differentiated as *D. bakeri* (Nash) Fernald.

13. *Digitaria texana* Hitchc. (Fig. 839.) Perennial, erect or somewhat decumbent and branching at base; culms 30 to 60 cm. tall; lower sheaths, rarely all the sheaths, villous or velvety-pubescent, the uppermost glabrous; ligule prominent; blades flat, the lower villous, the upper glabrate, 10 to 15 cm. long, 3 to 5 mm. wide; racemes mostly 5 to 10, slender, pale, ascending or erect, 5 to 12 cm. long, the axis 1 to 4 cm. long; rachis angled, the scabrous margins much narrower than the whitish center; spikelets mostly rather distant, 2 to 2.5 mm. long, from short-villous to nearly glabrous, the silky hairs not at all capitellate; first glume obsolete; second glume and sterile lemma as long as the pale acute fertile lemma.

2 —Sandy oak woods or sandy prairie, southern Texas.

14. *Digitaria runyoni* Hitchc. (Fig. 840.) Perennial; culms ascending, 40 to 70 cm. tall, the base often long-creeping and rooting, many-noded; sheaths densely villous or the upper glabrate; blades flat, the lower densely velvety-villous, the upper sparingly pilose or glabrous, mostly less than 10 cm. long, 3 to 6 mm. wide; racemes 5 to 10, on an axis 1 to 4 cm. long, mostly suberect, 7 to 12 cm. long, pale, sometimes naked at base, the rachis flat-triangular; spikelets narrowly lanceolate, acute, 2.8 to 3.5 mm. long; first glume minute or obsolete; second glume and sterile lemma equal, sparsely to densely villous on the internerves, the lemma

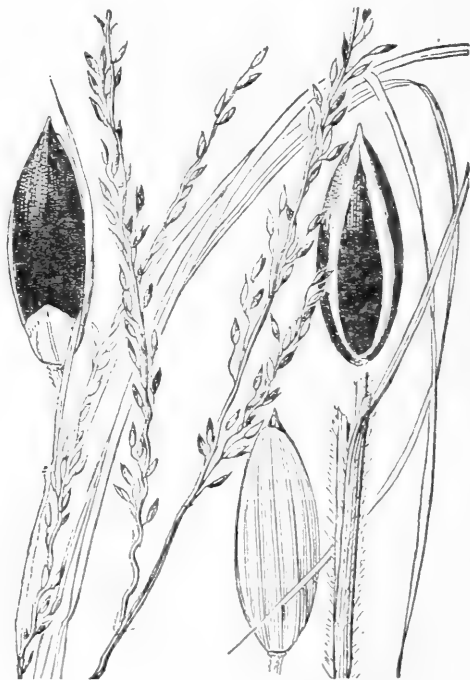


FIGURE 838.—*Digitaria gracillima*. Plant, $\times 1$; two views of spikelet, and floret, $\times 10$. (Type.)

glabrous on the middle internerves; fertile lemma acuminate, usually a little shorter than the spikelet, pale at maturity. 2 —Sand dunes and sandy prairies along the coast, southern Texas.

15. *Digitaria pauciflora* Hitchc. (Fig. 841.) Perennial; culms erect or somewhat decumbent at base, 0.5 to



FIGURE 839.—*Digitaria texana*. Plant, $\times 1$; spikelet and floret, $\times 10$. (Type.)

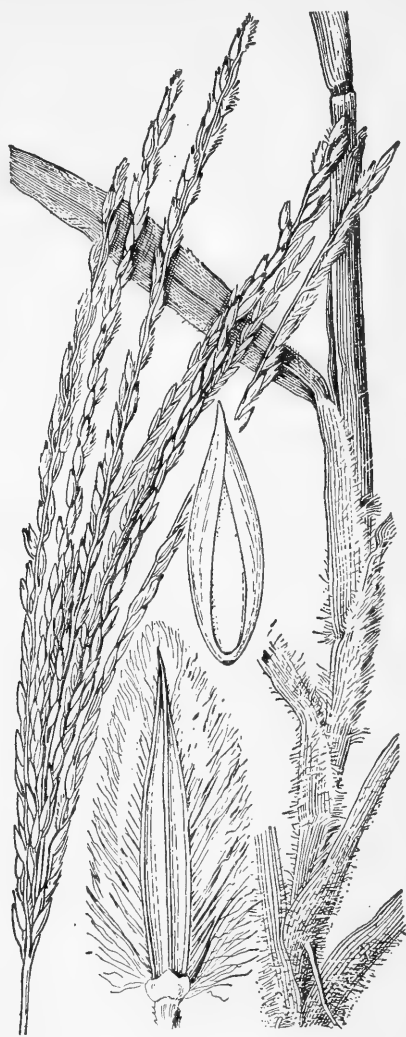


FIGURE 840.—*Digitaria runyoni*. Plant, $\times 1$; spikelet and floret, $\times 10$. (Type.)

1 m. tall, very slender, sparingly branching; foliage grayish-villous, the blades 6 to 12 cm. long, about 2 mm. wide; racemes 2 or 3, ascending or erect, 5 to 11 cm. long, the filiform rachis naked for 1 to 1.5 cm. at base, or with distant abortive spikelets; spikelets rather distant, elliptic, about 3.2 mm. long, glabrous; first glume minute with a hyaline erose margin; second glume and sterile lemma finely nerved, as long as the grayish fertile lemma. 24 —Pinelands, southern Florida.

16. *Digitaria subcálva* Hitchc. (Fig. 842.) Perennial; culms tufted, slender, ascending from a curved base, 40 to 100 cm. tall; sheaths papillose-pilose;

blades flat, scabrous, the lower pilose, 3 to 15 cm. long, 1 to 3 mm. wide; racemes 2 to 4, narrowly ascending, 5 to 12 cm. long, approximate, the rachis slender, triangular, mostly naked at base for 1 to 1.5 cm.; spikelets 2.5 to 2.8 mm. long, acute; first glume obsolete; second glume and sterile lemma slightly shorter than the acute pale or drab fruit, the internerves from obscurely to distinctly appressed silky-pubescent. 24 — Known only from Plant City, Fla.

17. *Digitaria albicóma* Swallen. (Fig. 843.) Culms 65 to 75 cm. tall, erect, simple or branched at the base; lower sheaths densely villous, the upper elongate, glabrous or papillose-

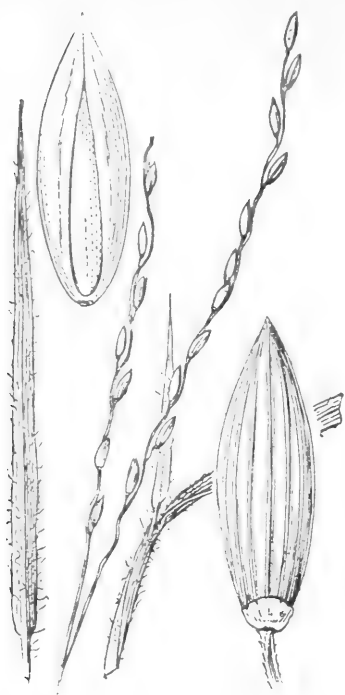


FIGURE 841.—*Digitaria pauciflora*. Plant, $\times 1$; spikelet and floret, $\times 10$. (Type.)

pilose toward the base; blades 10 to 30 cm. long, 3 to 5 mm. wide, pilose, the margins scabrous; racemes 5 to 9, 8 to 12 cm. long, ascending or spreading, naked at base; spikelets solitary or paired, 2.5 to 2.8 mm. long, glabrous, one subsessile, the other pedicellate; first glume obsolete; the second narrow, 3-nerved; sterile lemma as long as the fruit, 5- to 7-nerved; fruit 2.5 to 2.8 mm. long, dark brown. ♀ —Open sandy woods. Known only from Chinsegut Hill Sanctuary, Brooksville, Fla.

DIGITARIA PÉNTZII Stent. Culms densely tufted, erect, stoloniferous, with conspicuously hairy sheaths; racemes few to several, ascending to spreading, approximate on a short axis; spikelets about 3 mm. long, villos, the first glume well developed. ♀ —Introduced from South Africa. On trial as a pasture grass in the Southern States.

DIGITARIA DECUMBENS Stent. Similar to *D. pentzii*, extensively stoloniferous or creeping, the culms less densely tufted and more leafy; sheaths nearly glabrous; racemes spreading at maturity; spikelets 2.7 to 3 mm. long, glabrous or sparingly silky on the internerves. ♀ —Introduced from South Africa, and grown as a pasture grass in Florida and southern California. This and the preceding are not known to set seed and are planted by cuttings.



FIGURE 842.—*Digitaria subcalva*. Plant, $\times 1$; spikelet and floret, $\times 10$. (Type.)

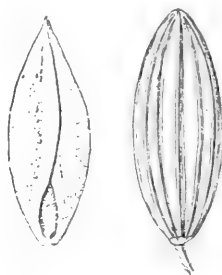


FIGURE 843.—*Digitaria albicoma*. Spikelet and floret, $\times 10$. (Type.)

DIGITARIA SWAZILANDENSIS Stent. Culms tufted, compressed, leafy, 25 to 50 cm. tall, erect to spreading, and with slender wiry stolons, hairy at the nodes; blades flat, rather soft; racemes 2 or 3, digitate, pale, 5 to 8 cm. long; spikelets 2.3 mm. long; first glume minute, the second half as long as the spikelet; sterile lemma strongly nerved, obscurely pilose on the margin; fruit drab at maturity. ♀ —Introduced from South Africa. Grown at experiment stations, Tifton, Ga., and Gainesville, Fla.

130. LEPTOLÓMA Chase

Spikelets on slender pedicels; first glume minute or obsolete; second glume 3- to 5-nerved, nearly as long as the 5- to 7-nerved sterile lemma, a more or less prominent stripe of appressed silky hairs down the internerves and margins of each, the sterile lemma empty or enclosing a minute nerveless rudimentary palea; fertile lemma cartilaginous, elliptic, acute, brown, the delicate hyaline margins enclosing the palea. Branching perennials with brittle culms, felty-pubescent at base, flat blades, and open or diffuse panicles, these breaking away at maturity, becoming tumbleweeds. Type species, *Leptoloma cognatum*. Name from Greek *leptos*, thin, and *loma*, border, alluding to the thin margins of the lemma.

Spikelets 2.5 to 3 mm. long; culms spreading from a knotty, often densely hairy, base.

1. *L. COGNATUM*.

Spikelets 4 mm. long; plants branching at base, producing long slender rhizomes.

2. *L. ARENICOLA*.

1. *Leptoloma cognatum* (Schult.)

Chase. FALL WITCHGRASS. (Fig. 844.)

Ascending from a decumbent knotty often densely hairy base, often forming large bunches, pale green, leafy; culms 30 to 70 cm. long; blades mostly less than 10 cm. long, 2 to 6 mm. wide, rather rigid; panicle one-third to half the entire height of the plant, purplish and short-exserted at maturity, very diffuse, the capillary branches soon widely spreading, pilose in the axils, the spikelets solitary on long capillary pedicels, narrowly elliptic, 2.5 to 3 mm. long, abruptly acuminate. ♀ (*Panicum cognatum* Schult., *Panicum autumnale* Bosc.)—Dry soil and sandy fields, New Hampshire to Minnesota, south to Florida, Texas, and Arizona; northern Mexico. A fairly palatable grass.

2. *Leptoloma arenicola* Swallen.

(Fig. 844A.) Culms 30 to 40 cm. long, branching at base, with slender rhizomes as much as 50 cm. long, sometimes branching, the scales thin, softly pubescent; lower sheaths and blades softly pubescent, the upper glabrous; blades flat, 4 to 13 cm. long, 2 to 4 mm. wide; panicle nearly half the entire height of the plant, at maturity wider than long, few-flowered, the branches stiffly spreading, scabrous, bearing 2 to 5 spikelets near the ends and a few long stiff capillary 1-flowered branchlets, the lower bearing in addition 1 to few sterile branchlets; spikelets narrowly elliptic, acu-

minate, 4 mm. long, with 5 to 7 pale nerves, the internerves densely silky with appressed dark-purple hairs; fertile lemma 3.4 mm. long, dark brown with pale hyaline margins. ♀ —Sand hills, Kennedy County, Tex.

131. STENOTÁPHRUM Trin.

Spikelets embedded in one side of an enlarged and flattened corky rachis tardily disarticulating toward the tip at maturity, the spikelets remaining attached to the joints; first glume small; second glume and sterile lemma about equal, the latter with a palea or staminate flower; fertile lemma chartaceous. Creeping stoloniferous perennials, with short flowering culms, rather broad and short obtuse blades, and terminal and axillary racemes. Type species, *Stenotaphrum glabrum* Trin. Name from Greek, *stenos*, narrow, and *taphros*, trench, referring to the cavities in the rachis.

1. *Stenotaphrum secundatum* (Walt.) Kuntze. ST. AUGUSTINE GRASS. (Fig. 845.) Culms branching, compressed, the flowering shoots 10 to 30 cm. tall; blades mostly less than 15 cm. long, longer on the innovations, in rich soil 4 to 10 mm. wide; racemes 5 to 10 cm. long; spikelets solitary or in pairs, rarely threes, 4 to 5 mm. long. ♀ —Moist, especially mucky soil, mostly near the seashore,

South Carolina to Florida and Texas; American Tropics. Cultivated as a lawn grass in the coastal cities; also in Marin County, Calif., and escaping. The lawns have a coarse texture

but are otherwise satisfactory. Propagated by cuttings of the stolons. A variegated form with leaves striped with white is used as a basket plant. Called by gardeners var. *variëgatum*.

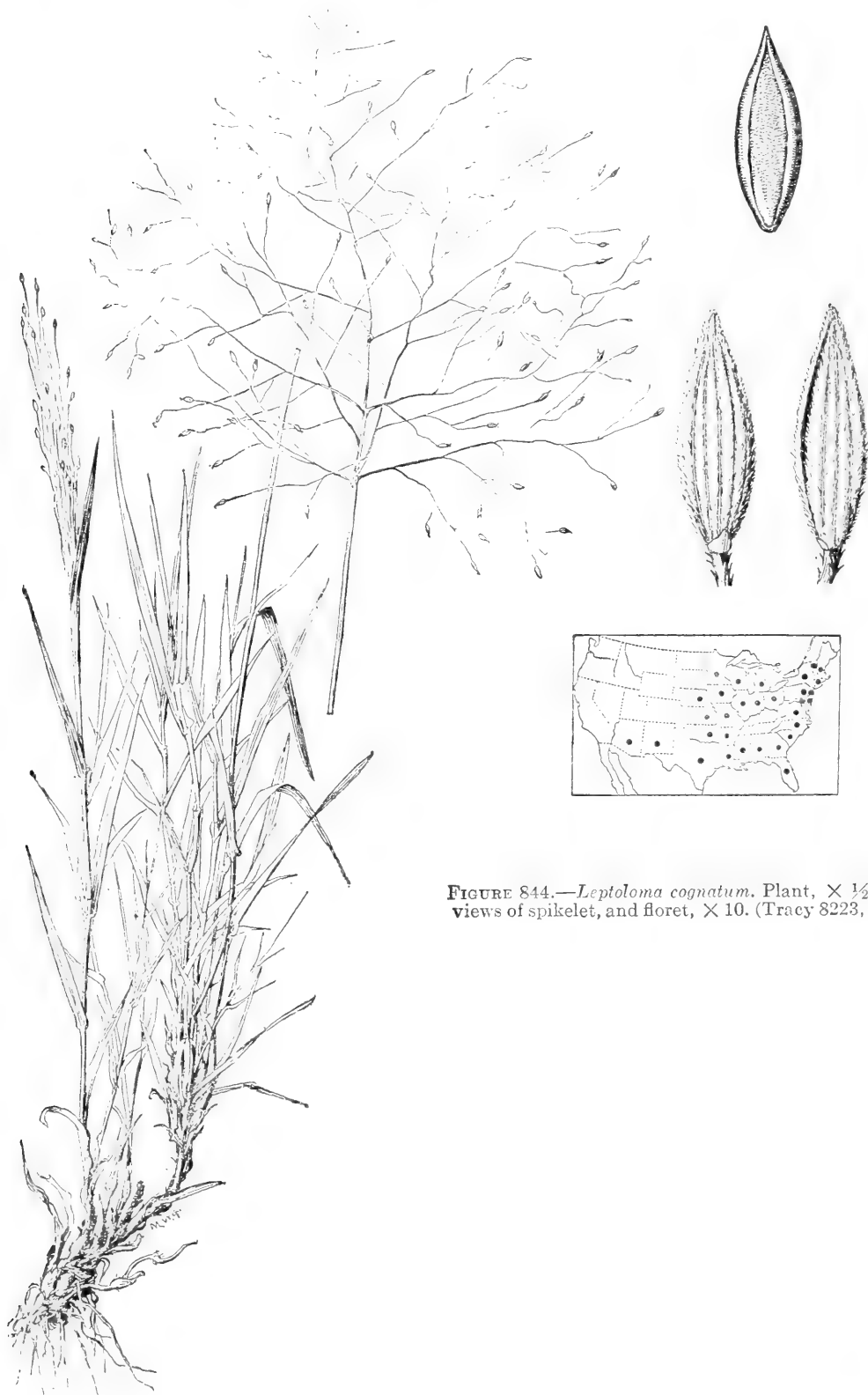


FIGURE 844.—*Leptoloma cognatum*. Plant, $\times \frac{1}{2}$; two views of spikelet, and floret, $\times 10$. (Tracy 8223, Tex.)

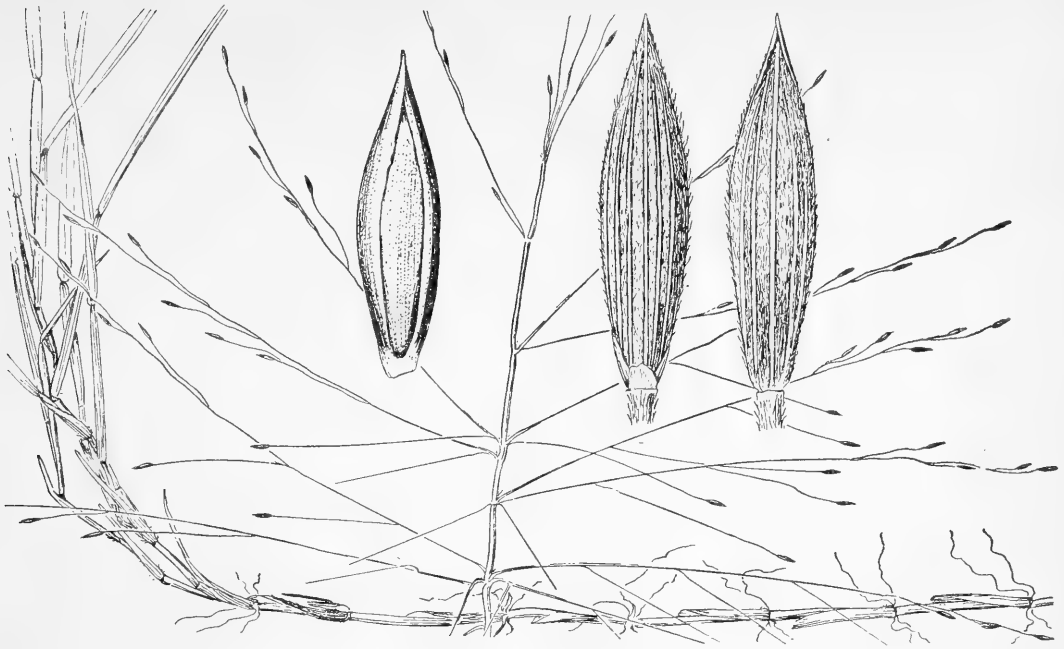


FIGURE 844A.—*Leptoloma arenicola*. Base and panicle, $\times \frac{1}{2}$; spikelet and floret, $\times 10$. (Type.)

132. ERIÓCHLOA H. B. K. CUPGRASS

Spikelets more or less pubescent, solitary or sometimes in pairs, short-pedicceled or subsessile, in two rows on one side of a narrow rachis, the back of the fertile lemma turned from the rachis; lower rachilla joint thickened, forming a more or less ringlike, usually dark-colored callus below the second glume, the first glume reduced to a minute sheath about this and adnate to it; second glume and sterile lemma about equal, the lemma usually enclosing a hyaline palea or sometimes a staminate flower; fertile lemma indurate, minutely papillose-rugose, mucronate or awned, the awn often readily deciduous, the margins slightly inrolled. Annual or perennial, often branching grasses, with terminal panicles of several to many spreading or appressed racemes, usually approximate along a common axis. The species are called cupgrasses because of the tiny cup made by the first glume at the base of the spikelet. Type species, *Eriochloa distachya* H. B. K. Name from Greek *erion*, wool, and *chloa*, grass, alluding to the pubescent spikelets and pedicels.

A West Indian species, *E. polystachya* H. B. K. (*E. subglabra* (Nash) Hitchc.), called malojilla in Puerto Rico, is used for forage. This has been tried along the Gulf Coast from Florida to southern Texas and has given excellent results in southern Florida and at Biloxi, Miss. It is similar in habit to Para grass, producing runners but less extensively, is suited to grazing, and will furnish a good quality of hay. It will not withstand either cold or drought. The name carib grass has been proposed for it. In Arizona *E. gracilis* has some value for forage in the national forests.

Spikelets, including slender awns, 7 to 10 mm. long..... 1. *E. ARISTATA*.
Spikelets not more than 6 mm., awnless or awn-tipped.

Pedicels with erect hairs at least half as long as the spikelet, racemes dense, erect or appressed; spikelets relatively blunt (see also *E. gracilis*).

Blades 2 to 3 mm. wide, elongate..... 2. *E. SERICEA*.

Blades 5 to 15 mm. wide, not more than 15 cm. long..... 3. *E. LEMMONI*.

Pedicels scabrous or short-pubescent; spikelets acuminate or acute.

Plants perennial.

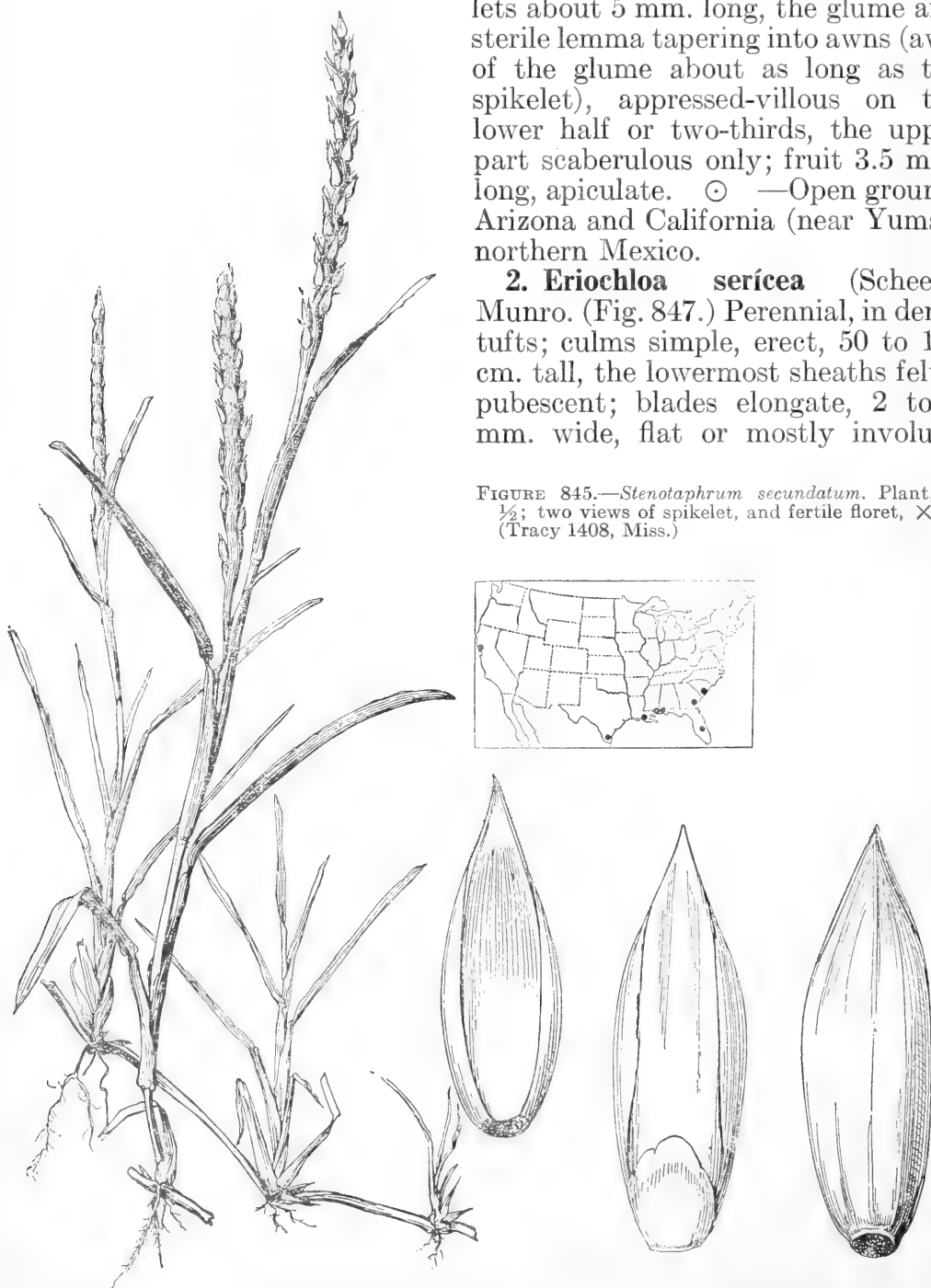
- Rachis velvety to villous; spikelets narrowly ovate..... 8. *E. MICHAUXII*.
 Rachis scabrous only; spikelets lanceolate..... 7. *E. PUNCTATA*.
 Plants annual.
 Rachis scabrous only; racemes slender. Introduced..... 4. *E. PROCERA*.
 Rachis pubescent; racemes stouter.
 Blades glabrous; fruit apiculate..... 5. *E. GRACILIS*.
 Blades pubescent; fruit with an awn about 1 mm. long..... 6. *E. CONTRACTA*.

1. *Eriochloa aristata* Vasey. (Fig. 846.) Annual; culms erect or spreading at base, 50 to 80 cm. tall; blades flat, mostly 10 to 12 mm. wide, gla-

brous or scabrous; racemes several, ascending, overlapping, 3 to 4 cm. long, the rachis pilose, the pedicels bearing several long stiff hairs; spikelets about 5 mm. long, the glume and sterile lemma tapering into awns (awn of the glume about as long as the spikelet), appressed-villous on the lower half or two-thirds, the upper part scaberulous only; fruit 3.5 mm. long, apiculate. ☉ —Open ground, Arizona and California (near Yuma); northern Mexico.

2. *Eriochloa sericea* (Scheele) Munro. (Fig. 847.) Perennial, in dense tufts; culms simple, erect, 50 to 100 cm. tall, the lowermost sheaths felty-pubescent; blades elongate, 2 to 3 mm. wide, flat or mostly involute,

FIGURE 845.—*Stenotaphrum secundatum*. Plant, $\times \frac{1}{2}$; two views of spikelet, and fertile floret, $\times 10$. (Tracy 1408, Miss.)



densely puberulent at the junction with the sheath; racemes several, appressed, somewhat distant, usually not overlapping, mostly 1.5 to 3 cm. long, the rachis hirsute, the pedicels with copious stiff hairs half as long as the spikelet; spikelets 4 mm. long, rather turgid, short-villous, the glume and sterile lemma acutish; fruit 3 mm. long, apiculate. ☉ —Prairies and hills, Texas and Oklahoma.

3. *Eriochloa lemmóni* Vasey and Scribn. (Fig. 848.) Annual; culms decumbent at base, 30 to 60 cm. tall; blades flat, only the larger as much as 15 cm. long, 5 to 15 mm. wide, velvety-pubescent on both surfaces; racemes erect, the upper overlapping, 1.5 to 3 cm. long, the axis and rachis densely villous, the pedicels with several long hairs; spikelets 4 mm. long, rather turgid, villous except the apex, abruptly narrowed to a short obtuse point; fruit 3 mm. long, slightly apiculate. ☉ —Canyons, southern Arizona and northern Mexico.

4. *Eriochloa prócera* (Retz.) C. E. Hubb. (Fig. 849.) Annual; culms spreading at base, 40 to 60 cm. tall; blades flat, 2 to 4 mm. wide; racemes loose, slender, ascending, 3 to 5 cm.

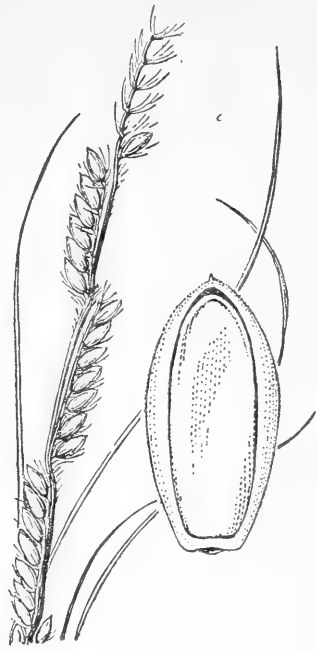


FIGURE 847.—*Eriochloa sericea*. Plant, $\times 1$; floret, $\times 10$. (Reverchon 1170, Tex.)



FIGURE 848.—*Eriochloa lemmóni*. Plant, $\times 1$; floret, $\times 10$. (Peebles and Harrison 4703, Ariz.)

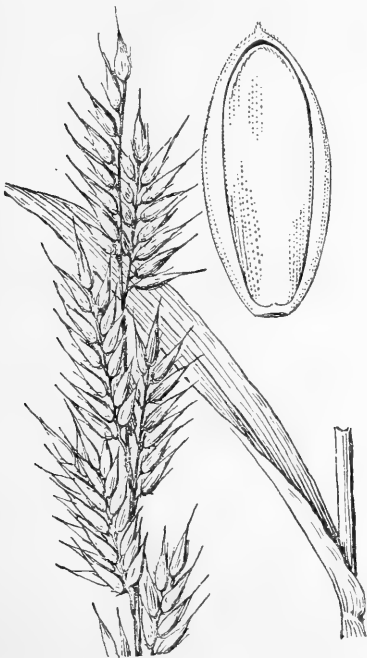


FIGURE 846.—*Eriochloa aristata*. Plant, $\times 1$; floret, $\times 10$. (Thornber 98, Ariz.)

long, the rachis scabrous only; spikelets 3 to 3.5 mm. long, appressed-pubescent, except toward the tip, the glume and sterile lemma acuminate; fruit 2 mm. long, the slender awn about 0.5 mm. long. ☉ (*E. ramosa*

Kuntze.)—Introduced on the university campus at Tucson, Ariz.; Cuba; tropical Asia.



FIGURE 849.—*Eriochloa procera*, $\times 10$. (Griffiths 1516, Ariz.)

5. *Eriochloa grácilis* (Fourn.) Hitchc. (Fig. 850.) Annual; culms erect or decumbent at base, 40 to 100 cm. tall; blades flat, glabrous, mostly 5 to 10 mm. wide; racemes several to numerous, approximate, ascending to slightly spreading, 2 to 4 cm. long, the axis and rachis softly pubescent, the pedicels short-pilose; spikelets 4 to 5 mm. long, rather sparsely appressed-pubescent, acuminate, or the glume sometimes tapering into an awn-point as much as 1 mm. long; sterile lemma empty; fruit about 3 mm. long, apiculate. ☉ —Open ground, often a weed in fields, Oklahoma and western Texas to southern California, south through the highlands of Mexico. (This species has been referred to *E. acuminata* (Presl) Kunth, an unidentified species of Mexico.)

ERIOCHLOA GRACILIS var. **MÍNOR** (Vasey) Hitchc. Mostly smaller, with more crowded, less acuminate spikelets, the pedicels with a few long hairs at the summit; fertile lemma about as long as the glume and sterile lemma (excluding the short points), obtuse or slightly apiculate. ☉ —Open ground, Texas, New Mexico, and Arizona; Mexico.

6. *Eriochloa contrácta* Hitchc. PRAIRIE CUPGRASS. (Fig. 851.) Annual; culms erect or sometimes decumbent at base, pubescent at least about the nodes, 30 to 70 cm. tall;

blades pubescent, usually not more than 5 mm. wide; panicle usually less than 15 cm. long, contracted, cylindric, the racemes appressed, closely overlapping, 1 to 2 cm. long, the axis and rachises villous; spikelets 3.5 to 4 mm. long, excluding the awn-tip, appressed-villous; glume awn-tipped; sterile lemma slightly shorter, acuminate, empty; fruit 2 to 2.5 mm. long, with an awn nearly 1 mm. long. ☉ —Open ground, ditches, low fields, and wet places, Nebraska to Colorado, Louisiana and Arizona; introduced in Missouri and Virginia. Differing from *E. gracilis* in the pubescent foliage, subcylindric panicle, and the awned fruit.

7. *Eriochloa punctáta* (L.) Desv. (Fig. 852.) Perennial; culms in tufts, usually 50 to 100 cm. tall; blades flat, mostly 5 to 10 mm. wide, glabrous; racemes several, ascending, overlapping, 3 to 5 cm. long, the axis, rachises, and pedicels scabrous only; spikelets 4 to 5 mm. long, lanceolate, rather sparsely appressed-pilose; glume tapering to an awn-point about 1 mm. long; sterile lemma a little shorter than the glume, empty; fruit about half as long as the glume, with an awn 1 mm. long or more. ☉ —Marshes, river banks, and moist ground, southwestern Louisiana and southern Texas; American Tropics.

8. *Eriochloa michaúxii* (Poir.) Hitchc. (Fig. 853.) Perennial; culms erect, rather stout, 60 to 120 cm. tall; blades flat or, on the innovations, sometimes involute, elongate, 2 to 14 mm. wide, usually less than 1 cm., glabrous; racemes ascending or spreading, usually numerous, 3 to 5 or even to 15 cm. long, the axis 15 to 30 cm. long, this and the rachises densely velvety-pubescent; spikelets narrowly ovate, 4 to 5 mm. long, appressed-villous, acute; sterile floret usually with a well-developed palea and stamens; fruit 3 to 4 mm. long, hirsutulous at apex, apiculate or with an awn not more than 0.3 mm. long. ☉ (*E. mollis* Kunth.)—Brackish or fresh meadows and marshes and sandy



FIGURE 850.—*Eriochloa gracilis*. Plant, $\times \frac{1}{2}$; two views of spikelet, and floret, $\times 10$. (McDougal, Ariz.)



FIGURE 851.—*Eriochloa contracta*. Panicle, $\times 1$; floret, $\times 10$. (Hitchcock 13420, Tex.)

prairies, southeastern Georgia and Florida. A form with narrow blades



FIGURE 852.—*Eriochloa punctata*. Panicle, $\times 1$; floret, $\times 10$. (Hitchcock 9661, Jamaica.)

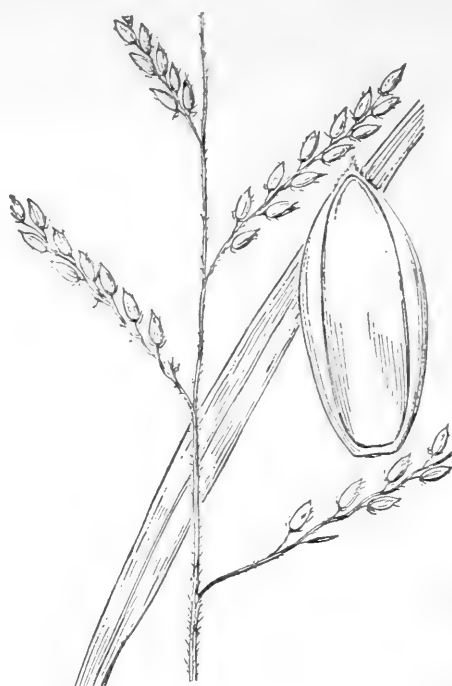


FIGURE 853.—*Eriochloa michauxii*. Plant, $\times 1$; floret, $\times 10$. (Amer. Gr. Natl. Herb. 297, Fla.)

and relatively few racemes, the axis and rachis puberulent, has been described as *E. mollis* var. *longifolia* Vasey. It grades into the typical form with broader blades and more numerous racemes; the sterile floret contains a staminate flower.

ERIOCHLOA MICHAUXII var. *SIMPSONI* Hitchc. Resembling the narrow-leaved form of the species; racemes few, appressed; sterile lemma empty. ☉ —Moist places, Fort Myers to Cape Sable, Fla.

ERIOCHLOA VILLÓSA (Thunb.) Kunth. Tall annual with few to several racemes, the rachis and pedicels very woolly, the rather blunt, turgid pubescent spikelets about 5 mm. long. ☉ —Ballast, near Portland, Oreg., occasionally cultivated; adventive in Colorado. Eastern Asia. (Had been confused with *E. nelsoni* Scribn. and Smith of Mexico.)

133. BRACHIÁRIA (Trin.) Griseb.

Spikelets solitary, rarely in pairs, subsessile, in 2 rows on one side of a 3-angled, sometimes narrowly winged rachis, the first glume turned toward the rachis; first glume short to nearly as long as the spikelet; second glume and sterile lemma about equal, 5- to 7-nerved, the lemma enclosing a hyaline palea and sometimes a staminate flower; fertile lemma indurate, usually papilloserugose, the margins inrolled, the apex rarely mucronate or bearing a short awn. Branching and spreading annuals or perennials, with linear blades and several spreading or appressed racemes approximate along a common axis.

Type species, *Brachiaria erucaeformis*. Name from Latin *brachium*, arm, alluding to the armlike racemes.

- Spikelets densely silky-pubescent; plants perennial..... 1. *B. CILIATISSIMA*.
 Spikelets glabrous; plants annual.....
 Spikelet flat-beaked beyond the fruit..... 2. *B. PLATYPHYLLA*.
 Spikelet not beaked beyond the fruit..... 3. *B. PLANTAGINEA*.

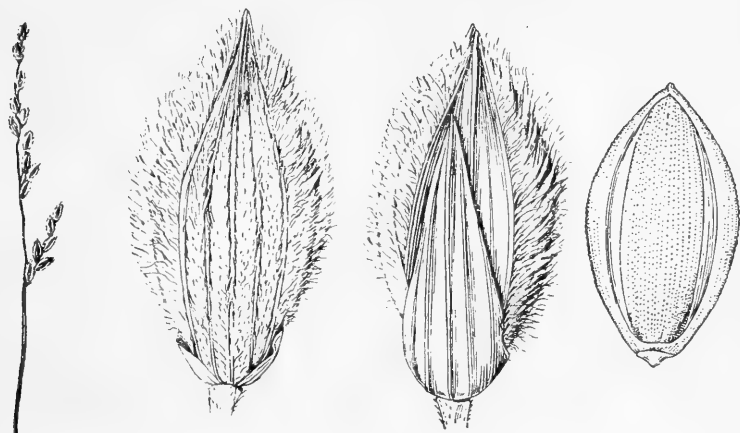


FIGURE 854.—*Brachiaria ciliatissima*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Type.)

1. *Brachiaria ciliatissima* (Buckl.) Chase. (Fig. 854.) Perennial, producing long leafy stolons with short internodes, rooting at the swollen nodes, the blades short, firm, divaricately spreading; flowering culms erect or ascending, 15 to 40 cm. tall, the nodes bearded; sheaths sparsely to densely pilose; blades 3 to 7 cm. long, 3 to 5 mm. wide, tapering to a sharp point, usually ciliate along the lower part of the thick white margin; panicle finally long-exserted, 3 to 6 cm. long, the few branches erect or ascending, 1 to 2 cm. long; spikelets 4 mm. long; first glume three-fourths the length of the spikelet, glabrous; second glume and sterile lemma about equal, 5-nerved, the marginal part densely white-silky; fruit 3 mm. long. ☉ —Open sandy ground, Texas, Oklahoma, and Arkansas (Benton County).

2. *Brachiaria platyphylla* (Griseb.) Nash. (Fig. 855.) Annual; culms decumbent, rooting at the lower nodes; blades rather thick, 4 to 12 cm. long, 6 to 12 mm. wide; panicle short-exserted or included at base; racemes 2 to 6, distant, 3 to 8 cm. long, ascending or spreading, the rachis

winged, 2 mm. wide; spikelets ovate, 4 to 4.5 mm. long, about 2 mm. wide; first glume scarcely one-third the length of the spikelet, blunt; second glume and sterile lemma equal, exceeding the fruit and forming a flat beak beyond it, 3- to 5-nerved, with transverse veinlets toward the summit; fruit 3 mm. long, elliptic, papillose-roughened. ☉ (*B. extensa* Chase.)—Low, sandy, open ground, Georgia, Florida; Missouri; Arkansas, southern Louisiana, Texas, and Oklahoma; Cuba.

3. *Brachiaria plantaginea* (Link) Hitchc. (Fig. 856.) Resembling *B. platyphylla*, more widely creeping, usually taller, blades commonly wider; rachis 1 to 1.5 mm. wide, the margins infolded; first glume strongly clasping; transverse veinlets wanting or obscure on the second glume and sterile lemma, these not pointed beyond the fruit. ☉ —Open, mostly moist, ground, Metcalf, Ga.; ballast, Philadelphia, Pa., and Camden, N. J.; Mexico to Bolivia and Brazil.

Brachiaria erucaeformis (J. E. Smith) Griseb. (Fig. 857.) Spreading annual with rather delicate erect racemes and pubescent spikelets 2.5

mm. long. ☉ —Has been cultivated in grass gardens, occasionally escaped. Old World.

***Brachiaria subquadripára* (Trin.)**

Hitche. Creeping leafy perennial; culms 25 to 60 cm. long; blades flat, 5 to 10 cm. long, 4 to 8 mm. wide; racemes mostly 3 to 5, spreading, rather distant; spikelets 3.5 to 4 mm. long, elliptic, glabrous. 2 —Occasionally planted in southern Florida, thriving in dry weather and showing some promise as a forage grass. Asia.

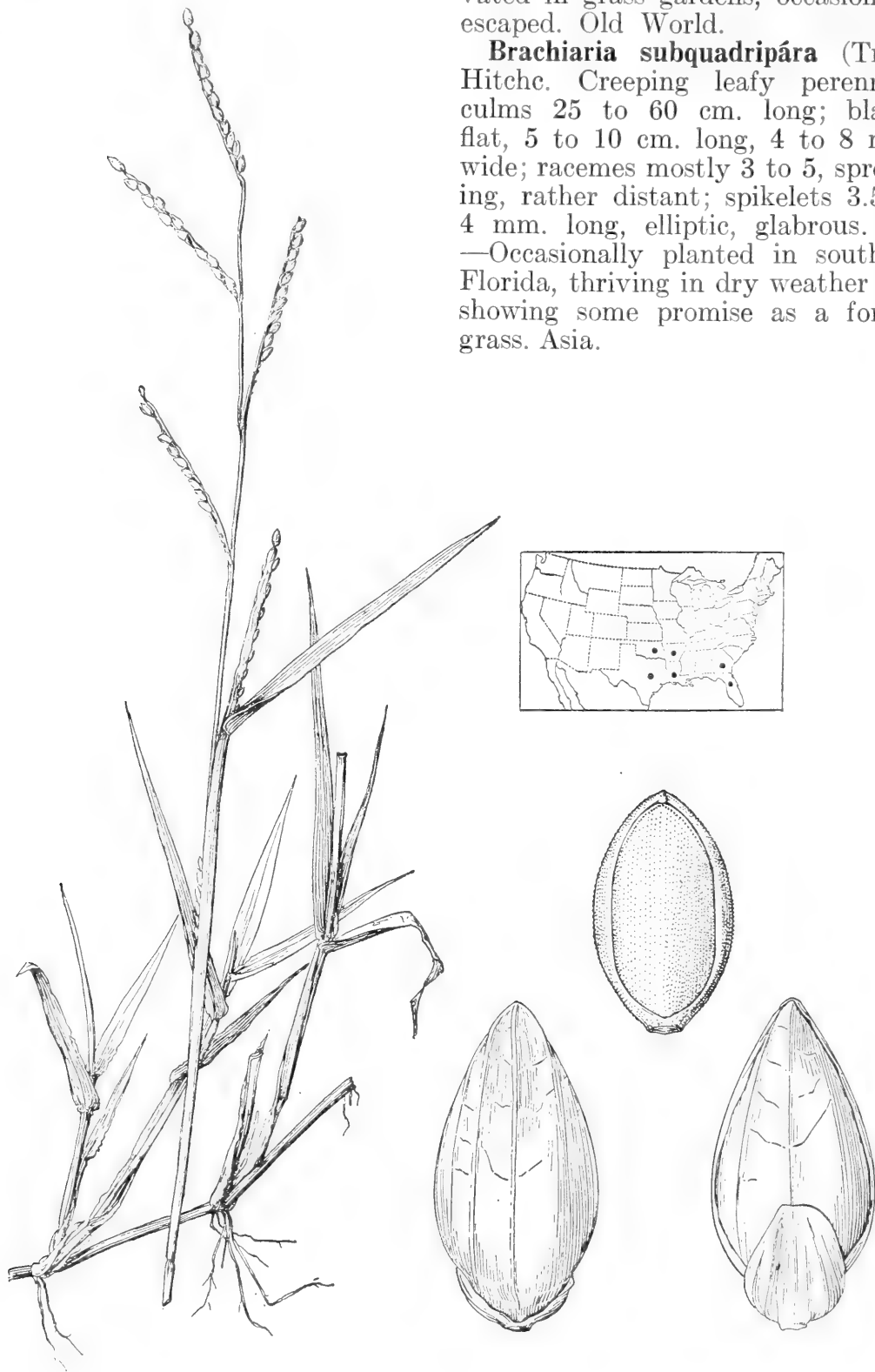


FIGURE 855.—*Brachiaria platyphylla*. Plant, $\times \frac{1}{2}$; two views of spikelet, and floret, $\times 10$. (Nealley, Tex.)

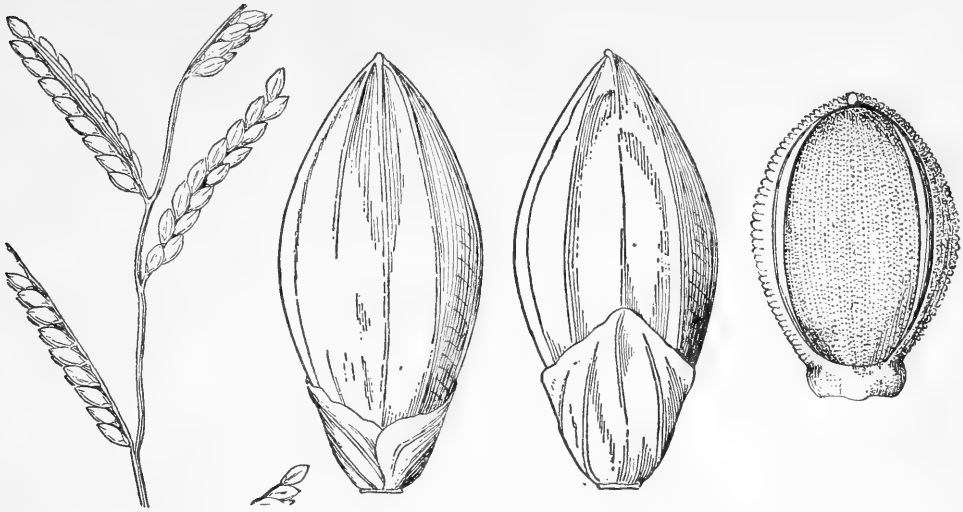


FIGURE 856.—*Brachiaria plantaginea*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Pringle 3904, Mex.)

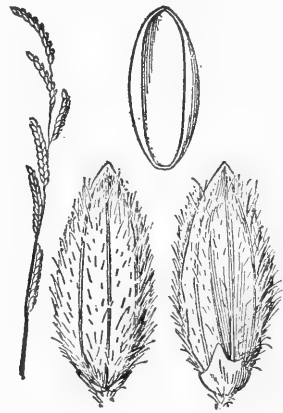


FIGURE 857.—*Brachiaria erucaeformis*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Cult.)

134. AXONOPUS Beauv.

Spikelets depressed-biconvex, not turgid, oblong, usually obtuse, solitary, subsessile, and alternate, in 2 rows on one side of a 3-angled rachis, the back of the fertile lemma turned from the rachis; first glume wanting; second glume and sterile lemma equal, the lemma without a palea; fertile lemma and palea indurate, the lemma oblong-elliptic, usually obtuse, the margins slightly inrolled. Stoloniferous or tufted perennials, rarely annuals, with usually flat or folded, abruptly rounded or somewhat pointed blades, and few or numerous, slender spikelike racemes, digitate or racemose along the main axis. Type species, *Axonopus compressus*. Name from Greek *axon*, axis, and *pous*, foot.

One of the species, *A. affinis*, is a predominant pasture grass in the alluvial or mucky soil of the southern Coastal Plain. It is of little importance on sandy soil and does not thrive on the uplands. *Axonopus compressus* is used as a lawn grass, for which purpose it is propagated by setting out joints of the stolons.

Spikelets 4 to 5 mm. long, glabrous; midnerve of glume and sterile lemma evident.

1. *A. FURCATUS*.

Spikelets 2 to 3 mm. long, sparsely appressed-silky; midnerve of glume and sterile lemma suppressed.

Second glume and sterile lemma scarcely, if at all, pointed beyond the fruit; blades 2 to 4 mm., rarely to 6 mm., wide; nodes glabrous..... 3. *A. AFFINIS*.

Second glume and sterile lemma distinctly pointed beyond the fruit; blades mostly 8 to 10 mm. wide; nodes often bearded..... 2. *A. COMPRESSUS*.

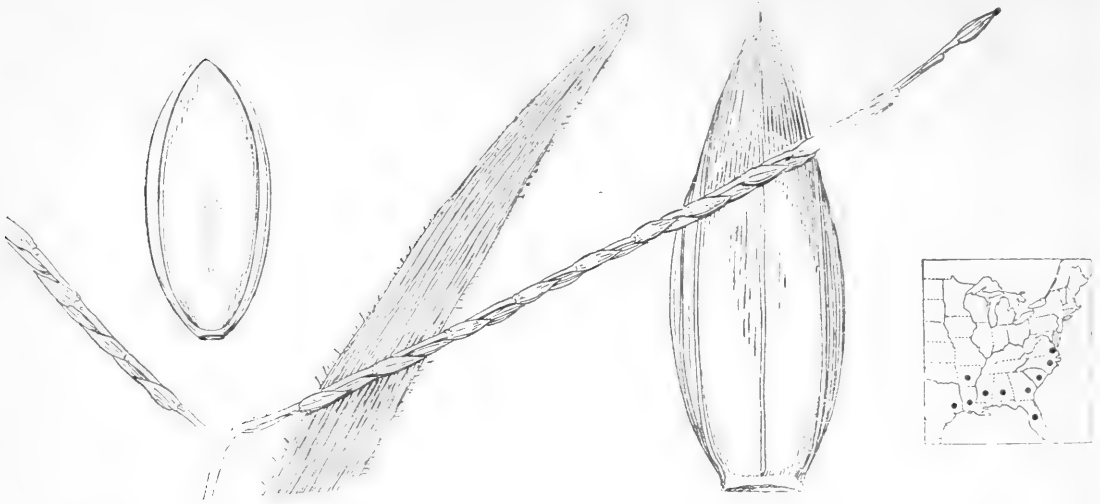


FIGURE 858.—*Axonopus furcatus*. Plant, $\times 1$; spikelet and floret, $\times 10$. (Combs 1205, Fla.)

1. *Axonopus furcatus* (Flügge) Hitchc. (Fig. 858.) Plants stoloniferous; culms compressed, tufted, erect, or decumbent at base, 40 to 100 cm. tall; blades flat, mostly 5 to 10 mm. wide, glabrous, ciliate, or even hirsute; racemes 2, digitate, rarely a third below, spreading, 5 to 10 cm. long; spikelets 4 to 5 mm. long (rarely less), glabrous, acute, glume and sterile lemma 5-nerved; fruit about two-thirds as long as the spikelet. \varnothing —Marshes, river banks, and moist pine barrens, on the Coastal Plain, southeastern Virginia to Florida, Texas, and Arkansas. (The name *Anastrophus paspaloides* has been misapplied to this species. *Digitaria paspalodes* Michx., upon which it is based, is *Paspalum distichum* L.)

2. *Axonopus compréssus* (Swartz) Beauv. (Fig. 859.) Stoloniferous; culms 15 to 50 cm. tall, relatively stout, compressed, the nodes usually densely pubescent; stolons elongate with short internodes and short, broad, obtuse blades; culm blades 8 to 25 cm. long, mostly 8 to 12 mm. wide, the uppermost greatly reduced, the margins ciliate; racemes 2 to 5, mostly 4 to 8 cm. long, ascending, the upper two conjugate, the others remote on the axis; spikelets 2.2 to 2.5, occasionally to 2.8, mm. long, sparsely pilose, the second glume and

sterile lemma distinctly pointed beyond the fruit. \varnothing —Moist ground, roadsides, and waste places, southern Florida and Louisiana; Mexico and the West Indies to Bolivia and Brazil.

3. *Axonopus affinis* Chase. (Fig. 860.) Tufted or stoloniferous; culms slender, glabrous, 25 to 35 cm. tall, rarely as much as 75 cm., sometimes forming dense mats; sheaths compressed, keeled; blades as much as 28 cm. long, usually less than 15 cm., 2 to 6 mm. wide, flat or folded; racemes 2 to 4, 2 to 10 cm. long, ascending; spikelets 2 mm. long, oblong-elliptic, subacute, the second glume and sterile lemma covering the fruit or slightly pointed beyond it, sparsely silky-pilose. \varnothing —Moist mucky or sandy meadows, open woods and waste places, North Carolina to Florida and west to Oklahoma and Texas; Cuba and southern Mexico; Venezuela and Colombia to Argentina. Naturalized and common in Australia.

135. REIMARÓCHLOA Hitchc.

Spikelets strongly dorsally compressed, lanceolate, acuminate, rather distant, subsessile, and alternate in 2 rows along one side of a narrow, flattened rachis, the back of the fertile lemma turned toward it; both glumes wanting, or the second sometimes present in the terminal spike-

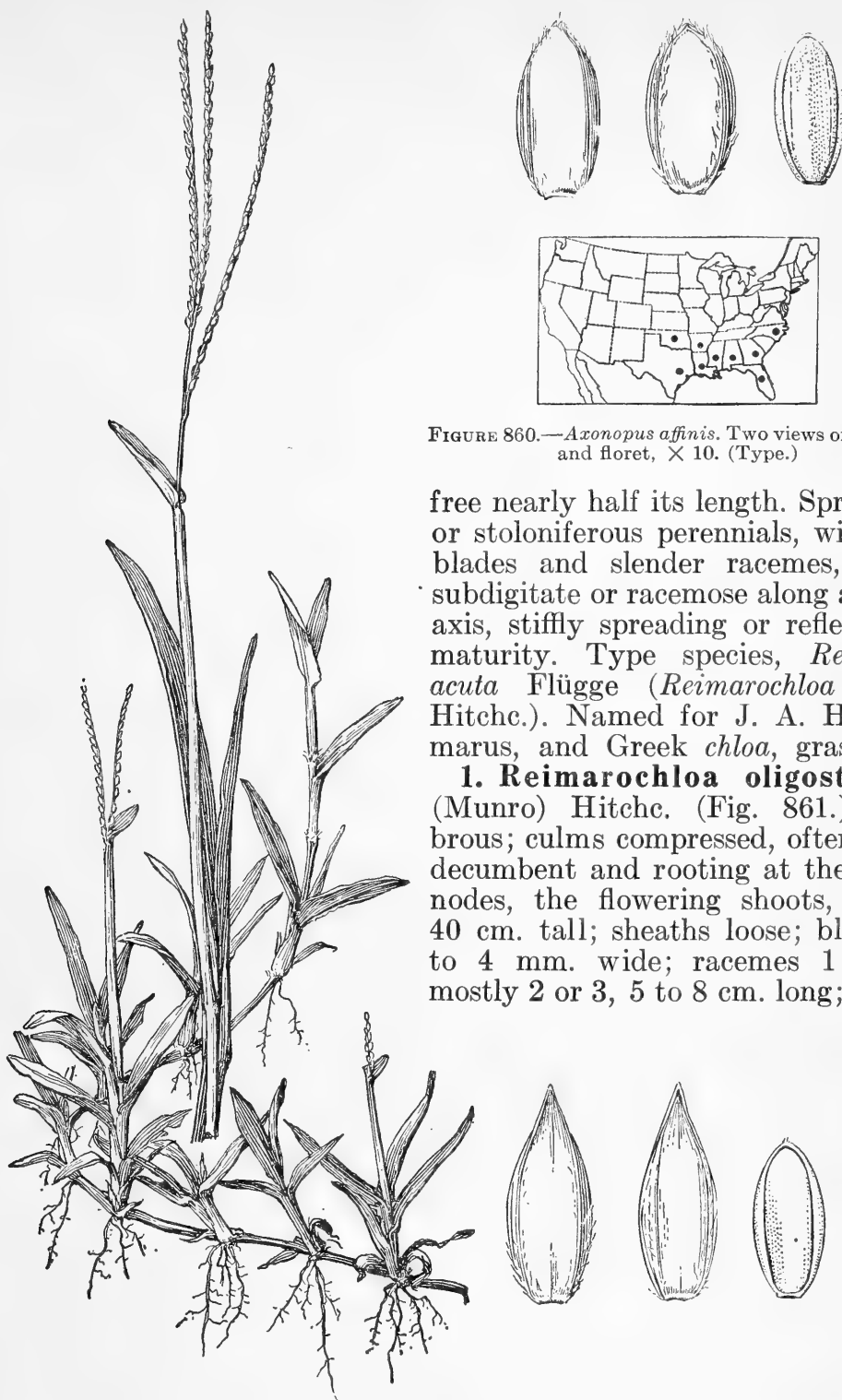


FIGURE 860.—*Axonopus affinis*. Two views of spikelet, and floret, $\times 10$. (Type.)

free nearly half its length. Spreading or stoloniferous perennials, with flat blades and slender racemes, these subdigitate or racemose along a short axis, stiffly spreading or reflexed at maturity. Type species, *Reimaria acuta* Flügge (*Reimarochloa acuta* Hitchc.). Named for J. A. H. Reimarus, and Greek *chloa*, grass.

1. *Reimarochloa oligostachya* (Munro) Hitchc. (Fig. 861.) Glabrous; culms compressed, often long-decumbent and rooting at the lower nodes, the flowering shoots, 20 to 40 cm. tall; sheaths loose; blades 2 to 4 mm. wide; racemes 1 to 4, mostly 2 or 3, 5 to 8 cm. long; spike-

FIGURE 859.—*Axonopus compressus*. Plant, $\times \frac{1}{2}$; two views of spikelet, and floret, $\times 10$. (Combs 413, Fla.)

let; sterile lemma about equaling the fruit, the sterile palea obsolete; fertile lemma scarcely indurate, faintly nerved, acuminate, the margins in-rolled at the base only, the palea

lets about 5 mm. long. 2 (*Reimaria oligostachya* Munro.)—In water or wet soil, Florida; Cuba. In general aspect resembles *Paspalum vaginatum* Swartz.



FIGURE 861.—*Reimarochloa oligostachya*. Plant, $\times 1$; two views of spikelet, and floret, $\times 10$. (Curtiss 3596A, Fla.)

136. PÁSPALUM L.

Spikelets planoconvex, usually obtuse, subsessile, solitary or in pairs, in 2 rows on one side of a narrow or dilated rachis, the back of the fertile lemma toward it; first glume usually wanting; second glume and sterile lemma commonly about equal, the former rarely wanting; fertile lemma usually obtuse, chartaceous-indurate, the margins inrolled. Perennials in the United States (except *P. boscianum* and *P. convexum*), with one to many spikelike racemes, solitary, paired, or several to many on a common axis. Type species, *Paspalum dissectum*. Name from Greek *paspalos*, a kind of millet.

Several species inhabiting meadows and savannas furnish considerable forage. *Paspalum dilatatum* is valuable for pasture, especially for dairy cattle in the Southern States, where it has been cultivated under the name water grass and recently Dallis grass. In the Hawaiian Islands, Australia, and some other countries, where it is called paspalum or paspalum grass, it is valuable as a pasture grass. *P. pubiflorum* var. *glabrum* is rather abundant in some regions and is considered a good forage grass. Vasey grass, *P. urvillei*, is used to a limited extent for hay and, when young, for pasture; the panicles, after the spikelets have fallen, also make excellent whisk brooms for brushing lint. In the Southern States (Virginia to Florida and even to California) *P. distichum*, because of its extensively creeping stolons, is useful for holding banks of streams and ditches.

1a. Rachis foliaceous, broad and winged.

Racemes falling from the axis, rachis extending beyond the uppermost spikelet.

3. *P. FLUITANS*.

Racemes persistent on the axis; rachis with a spikelet at the apex.

Spikelets 2 mm. long, obovate-oval..... 1. *P. DISSECTUM*.

Spikelets more than 3 mm. long, pointed..... 2. *P. ACUMINATUM*.

1b. Rachis not foliaceous nor winged (slightly winged in *P. boscianum*).

2a. Racemes 2, conjugate or nearly so at the summit of the culm, rarely a third below.

Spikelets elliptic to narrowly ovate.

Plants with creeping rhizomes or stolons.

Second glume and sterile lemma glabrous; spikelets flattened 4. *P. VAGINATUM*.

Second glume pubescent; spikelets relatively turgid..... 5. *P. DISTICHUM*.

Plants in dense tufts, without creeping rhizomes..... 11. *P. ALMUM*.

Spikelets suborbicular, broadly ovate or obovate.

Spikelets concavo-convex, sparsely long-silky around the margin; plant stoloniferous.

31. *P. CONJUGATUM*.

Spikelets plano-convex, not silky-margined; plants not stoloniferous.

Spikelets 3 to 3.5 mm. long..... 9. *P. NOTATUM*.

Spikelets 2 to 2.5 mm. long..... 10. *P. MINUS*.

2b. Racemes 1 to many, racemose on the axis, not conjugate.

3a. First glume developed on at least one of the pair of spikelets (often obsolete in some pairs in Nos. 22 and 23).

Spikelets turgidly biconvex..... 48. *P. BIFIDUM*.

Spikelets plano-convex.

Plants without rhizomes; culms tufted; spikelets pubescent..... 24. *P. LANGEI*.

Plants with stout scaly rhizomes; culms mostly solitary; spikelets glabrous.

Blades flat, 8 to 15 mm. wide..... 22. *P. UNISPICATUM*.

Blades folded at base, terete above, not more than 2 mm. wide.

23. *P. MONOSTACHYUM*.

3b. First glume normally wanting (occasionally developed on 1 to few spikelets in a raceme).

4a. Racemes terminal and axillary, the axillary sometimes hidden in the sheaths and perfecting grains cleistogamously, terminal inflorescence of 1 to 3, rarely to 6 racemes (see also *P. unispicatum* and *P. monostachyum*).5a. Spikelets not more than 1.8 mm. long (or sometimes 1.9 in *P. debile* and *P. propinquum*), usually 1.5 to 1.7 mm. (see also exceptional *P. ciliatifolium*).

Blades conspicuously ciliate, otherwise nearly glabrous.

- Blades relatively short, rounded at base and recurved-ascending; foliage aggregate toward the base, the upper culm relatively naked; spikelets glabrous, mostly 1.5 to 1.6 mm. long..... 12. *P. LONGEPEDUNCULATUM*.
- Blades mostly elongate, suberect, not aggregate toward the base; spikelets pubescent, 1.7 to 1.9 mm. long..... 20. *P. PROPINQUUM*.
- Blades and sheaths conspicuously pubescent throughout.
- Culms slender, erect or suberect; foliage not aggregate at base; blades suberect, usually not more than 5 mm. wide..... 13. *P. SETACEUM*.
- Culms stouter, mostly spreading; foliage more or less aggregate at base; blades spreading, usually more than 5 mm. wide..... 14. *P. DEBILE*.
- 5b. Spikelets 2 to 2.5 mm. long (or 1.8 to 1.9 mm. in *P. ciliatifolium* and *P. propinquum*).
- Foliage, except margins, glabrous as a whole or nearly so (sparsely pubescent in exceptional *P. ciliatifolium* and lower sheaths usually pubescent in *P. rigidifolium*).
- Blades stiff, usually not more than 6 mm. wide; spikelets mostly 2.2 to 2.4 mm. long..... 21. *P. RIGIDIFOLIUM*.
- Blades from lax to rather firm, if firm more than 6 mm. wide; spikelets not more than 2.1 mm. long.
- Spikelets mostly 2 mm. long, rounded at summit; blades mostly more than 8 mm. wide..... 19. *P. CILIATIFOLIUM*.
- Spikelets 1.8 to 1.9 mm. long, slightly pointed; blades not more than 8 mm. wide..... 20. *P. PROPINQUUM*.
- Foliage conspicuously pubescent (or sparsely so in exceptional specimens of *P. pubescens*).
- Culms erect or nearly so.
- Blades from sparsely to rather densely pilose, rather thin.
15. *P. SUPINUM*.
- Blades puberulent on both surfaces with long hairs intermixed or the lower surface nearly or quite glabrous except for a few long hairs along midrib and margin, usually rather firm..... 17. *P. STRAMINEUM*.
- Culms widely spreading or prostrate.
- Foliage coarsely hirsute; plants commonly relatively stout.
16. *P. PSAMMOPHILUM*.
- Foliage finely puberulent; plants usually grayish olivaceous.
- 4b. Racemes terminal on the primary culm or leafy branches, no truly axillary racemes.
- 6a. Spikelets conspicuously silky-ciliate around the margin, the hairs as long as the spikelet or longer.
- Racemes commonly 3 to 5; culms geniculate at base..... 32. *P. DILATATUM*.
- Racemes commonly 12 to 18; culms erect..... 33. *P. URVILLEI*.
- 6b. Spikelets not ciliate.
- 7a. Fruit dark brown and shining.
- Plants perennial; spikelets 2.2 to 2.8 mm. long, elliptic or obovate-oval.
- Spikelets obovate, turgid, the sterile lemma wrinkled; culms erect, densely cespitose..... 43. *P. PLICATULUM*.
- Spikelets elliptic, depressed, not turgid; culms decumbent or floating at the base.
- Plants terrestrial, culms decumbent at base..... 44. *P. TEXANUM*.
- Plants aquatic, lower part of culms floating..... 45. *P. HYDROPHILUM*.
- Plants annual; spikelets 2 to 3 mm. long, suborbicular or broadly obovate.
- Spikelets suborbicular, 2 to 2.2 mm. long, glabrous..... 46. *P. BOSCIANUM*.
- Spikelets broadly obovate, 2.2 to 3 mm. long, pubescent.
47. *P. CONVEXUM*.
- 7b. Fruit pale to stramineous (brown but not shining in *P. virgatum*).
- 8a. Plants robust, 1 to 2 m. tall.
- Spikelets pubescent at least toward the summit; fruit brown at maturity.
42. *P. VIRGATUM*.
- Spikelets glabrous; fruit pale.
- Culms ascending; leaves crowded toward the base.... 39. *P. DIFFORME*.
- Culms erect or suberect, leafy throughout.
- Glume and sterile lemma slightly inflated and wrinkled, green.
40. *P. FLORIDANUM*.
- Glume and sterile lemma not inflated and wrinkled, rusty-tinged.
41. *P. GIGANTEUM*.
- 8b. Plants not robust, if more than 1 m. tall, culms relatively slender.

- 9a. Spikelets suborbicular or broadly obovate or broadly oval.
 Spikelets turgidly plano-convex, 3.5 to 4 mm. long.... 39. *P. DIFFORME*.
 Spikelets depressed plano-convex or lenticular, 2.2 to 3.4 mm. long.
 Spikelets solitary; glume and sterile lemma firm.
 Spikelets orbicular, 3 to 3.2 mm. long, scarcely one-third as thick;
 blades usually equaling the base of the panicle or overtopping it.
 36. *P. CIRCULARE*.
 Spikelets longer than broad, more than one-third as thick; panicle
 usually much exceeding the blades.
 Sheaths and blades pilose, mostly conspicuously so.
 35. *P. LONGIPILUM*.
 Sheaths and blades from glabrous to sparsely pilose.
 34. *P. LAEVE*.
 Spikelets paired and solitary in the same raceme (rarely all solitary or
 all paired).
 Spikelets 2.2 to 2.5 mm. (rarely to 2.8 mm.) long; foliage not con-
 spicuously villous..... 37. *P. PRAECOX*.
 Spikelets 2.7 to 3.4 mm. long; lower sheaths and blades mostly con-
 spicuously villous at least at base..... 38. *P. LENTIFERUM*.
- 9b. Spikelets elliptic to oval or obovate.
 Culms decumbent at base, rooting at the lower nodes (occasional plants
 in dry situations erect), branching.
 Spikelets turgidly plano-convex, 3 to 3.2 mm. long; culms rather stout.
 6. *P. PUBIFLORUM*.
 Spikelets depressed plano-convex; culms rather slender.
 Spikelets glabrous..... 7. *P. LIVIDUM*.
 Spikelets pubescent..... 8. *P. HARTWEGIANUM*.
 Culms erect to spreading, not rooting at the nodes.
 Racemes solitary, rarely paired; spikelets usually solitary, 1.3 to 1.6
 mm. long..... 30. *P. SAUGETII*.
 Racemes 2 or more, commonly 3 to 8.
 Spikelets about 1.3 mm. long, obovate, glandular-pubescent.
 25. *P. BLODGETTII*.
 Spikelets 1.5 mm. or more long, elliptic or elliptic-obovate, the ob-
 scure pubescence not glandular.
 Nodes or some of them appressed-pilose; spikelets green or purplish.
 26. *P. CAESPITOSUM*.
 Nodes glabrous; spikelets pale or brownish.
 Spikelets 1.7 to 2 mm. long; racemes slender, lax.
 Foliage glabrous or nearly so; spikelets elliptic-obovate.
 27. *P. LAXUM*.
 Foliage softly pilose; spikelets broadly ovate.
 29. *P. VIRLETII*.
 Spikelets 2.2 to 2.5 mm. long; racemes rigid.
 28. *P. PLEOSTACHYUM*.

1. Dissécta.—Blades flat; rachis foli-
 aceous. Aquatics, subaquatics,
 or plants of wet ground.

1. *Paspalum disséctum* (L.) L.
 (Fig. 862.) Glabrous, olive green,
 creeping, freely branching, the flower-
 ing branches ascending, 20 to 60 cm.
 long; blades thin, 3 to 6 cm. long,
 4 to 5 mm. wide; panicles terminal
 and axillary, the racemes 2 to 4,
 usually erect, 2 to 3 cm. long; rachis
 2 to 3 mm. wide; spikelets solitary,
 obovate, subacute, 2 mm. long. 2
 —On muddy and sandy banks of
 ponds and ditches or in shallow water,
 New Jersey; Illinois to Oklahoma,
 south to Florida and Texas; Cuba.

2. *Paspalum acuminátum* Raddi.
 (Fig. 863.) Culms decumbent at base,
 sometimes extensively creeping, 30
 to 100 cm. long; blades 4 to 12 cm.
 long; 5 to 12 mm. wide; racemes 3
 to 5, erect or ascending, 3.5 to 7
 cm. long; rachis 3 to 3.5 mm. wide;
 spikelets solitary, 3.5 mm. long,
 abruptly pointed. 2 —In shallow
 water or wet open ground, from
 southern Louisiana and Texas to
 Argentina.

3. *Paspalum flúitans* (Ell.) Kunth.
 (Fig. 864.) Annual aquatic; culms
 mostly submerged, rooting at the
 nodes, 30 to 100 cm. long; sheaths



FIGURE 862.—*Paspalum dissectum*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Commons 85, Del.)

glabrous or pilose, with an erect auricle 1 to 5 mm. long on each side, the sheaths of the floating branches inflated, commonly long-hirsute and purple-spotted; blades usually 10 to 20 cm. long, 10 to 15 mm. wide (sometimes 25 cm. long and 2.5 cm. wide); panicles mostly 10 to 15 cm. long, of numerous ascending, spreading or recurved racemes, 3 to 8 cm. long, falling

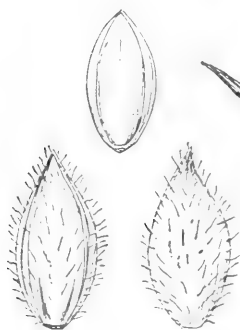


FIGURE 863.—*Paspalum acuminatum*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Arsène 3132, Mex.)

entire, the rachis 1.3 to 2 mm. wide; spikelets solitary, elliptic, 1.3 to 1.8 mm. long, acute or acuminate, pilose with delicate hairs, sometimes obscurely so, the sterile lemma with a V-shaped pink marking at base. ☉ —(*P. mucronatum* Muhl.; included in *P. repens* Bergius in Manual, ed. 1.) Floating in sluggish streams or standing water or creeping in wet places, Virginia to Illinois, Kansas



FIGURE 864.—*Paspalum fluitans*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Combs 912, Fla.)

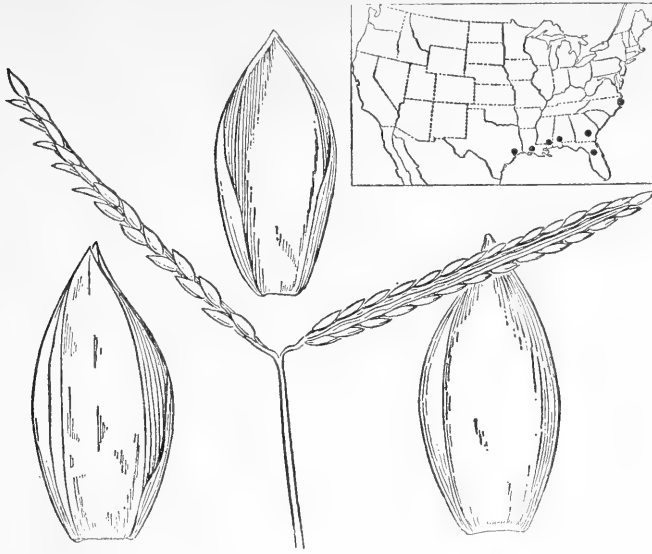


FIGURE 865.—*Paspalum vaginatum*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Hitchcock 9866, Jamaica.)

and Oklahoma, south to Florida and Texas; Venezuela.

PASPALUM RACEMOSUM Lam. Branching annual; blades 5 to 12 cm. long, 1 to 2 cm. wide; panicles tawny to purple; racemes numerous, 1 to 2 cm. long; spikelets about 2.7 mm. long, pointed; sterile lemma transversely fluted each side of the midnerve. \odot —Sometimes cultivated for ornament. Peru.

2. *Dísticha*.—Creeping, with wiry compressed culms and stolons or rhizomes; racemes mostly 2, paired or approximate.

4. *Paspalum vaginatum* Swartz. (Fig. 865.) Flowering culms 8 to 60 cm. tall; sheaths usually overlapping; blades 2.5 to 15 cm. long, 3 to 8 mm. wide, tapering to an involute apex; racemes at first erect, usually spreading or reflexed at maturity, 2 to 5 cm. long; rachis 1 to 2 mm. wide; spikelets solitary, 3.5 to 4 mm. long, ovate-lanceolate, acute, pale-stramineous; first glume rarely developed; midnerve of the second glume and sterile lemma usually suppressed. \mathfrak{Q} — Seacoasts and brackish sands, often forming extensive colonies, North Carolina to Florida and Texas, south to Argentina; tropics of Eastern Hemisphere.

5. *Paspalum dístichum* L. KNOT-GRASS. (Fig. 866.) Resembling *P. vaginatum*, sometimes with exten-

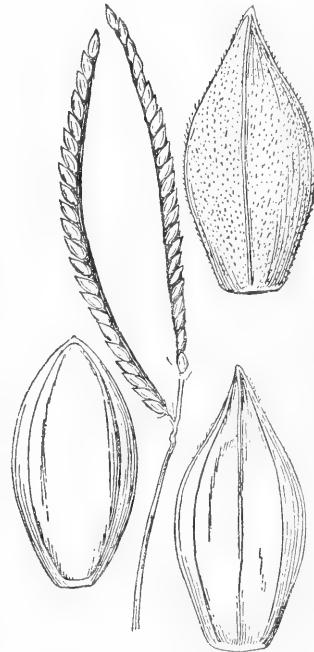


FIGURE 866.—*Paspalum dístichum*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Hitchcock 9394, Jamaica.)

sively creeping stolons with pubescent nodes; racemes 2 to 7 cm. long, commonly incurved; spikelets 2.5 to 3.5 mm. long, elliptic, abruptly acute, pale green; first glume frequently de-

veloped; second glume appressed-pubescent, the midnerve in glume and sterile lemma developed. 2 — Ditches and wet, rarely brackish places, New Jersey to Florida and Texas, Tennessee, and Arkansas, west to California and north along the coast to Washington; Idaho; south to Argentina; warm coasts of the Eastern Hemisphere.

PASPALUM PAUCISPICATUM Vasey. Resembling vigorous specimens of *P. distichum*, but with 3 to 5 racemes with mostly paired spikelets. 2 — A specimen collected by Palmer in 1888, said to be from "Southern California," is in the United States National Herbarium. The locality is doubtful, the species ranging from Sonora to Oaxaca.

3. *LÍVIDA*.—Culms compressed; racemes few to several, mostly plants of alkaline soil.

6. *Paspalum pubiflorum* Rupr. ex Fourn. (Fig. 867.) Culms decumbent at base, 40 to 100 cm. tall; sheaths, at least the lower, sparsely papillose-pilose; blades flat, usually 10 to 15 cm. long, 6 to 14 mm. wide, usually with a few stiff hairs at the rounded base; racemes mostly 3 to 5, 2 to 10 cm. long, rather thick, erect to spreading, the rachis 1.2 to 2 mm. wide; spikelets obovate, pubescent, about 3 mm. long. 2 (*P. hallii* Vasey and Scribn.)—Moist open ground, banks, low woods, along streams and irrigation ditches, especially in alkaline clay soil, Louisiana and Texas; Mexico and western Cuba.

PASPALUM PUBIFLORUM var. *GLÁBRUM* Vasey ex Scribn. Somewhat more robust, the sheaths less pilose, the racemes commonly longer and



FIGURE 867.—*Paspalum pubiflorum*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Hitchcock 5555, Mex.)

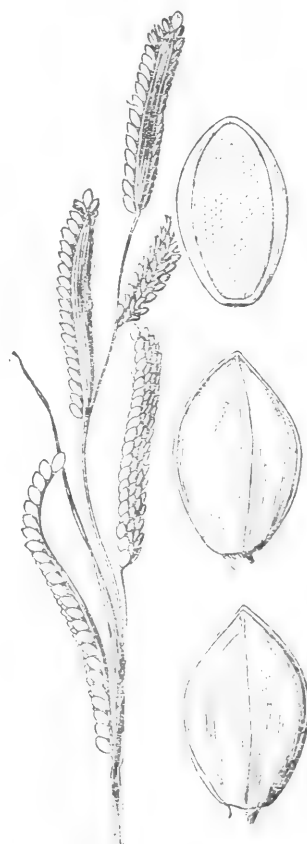


FIGURE 868.—*Paspalum lividum*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Arséne 3176, Mex.)

often more than 5; spikelets glabrous. 2 (*P. geminum* Nash; *P. laeviglume* Scribn.)—Moist low open ground, woods, and ditch banks, North Carolina, Ohio, and Indiana to Florida, west to Kansas and Texas; adventive, Chester, Pa.

7. *Paspalum lívidum* Trin. LONG-TOM. (Fig. 868.) Glabrous; culms solitary or few in a tuft, from a decumbent or creeping base, 50 to 100 cm. tall; blades 15 to 25 cm. long, 3 to 6 mm. wide; racemes usually 4 to 7, ascending, flexuous; rachis 1.5 to 2 mm. wide, dark livid purple; spikelets 2 to 2.5 mm. long, obovate, subacute. 2 —Low ground, wet savannas, and swamps, and along streams and ditches, Alabama to Texas and Mexico, south to Argentina; Cuba.

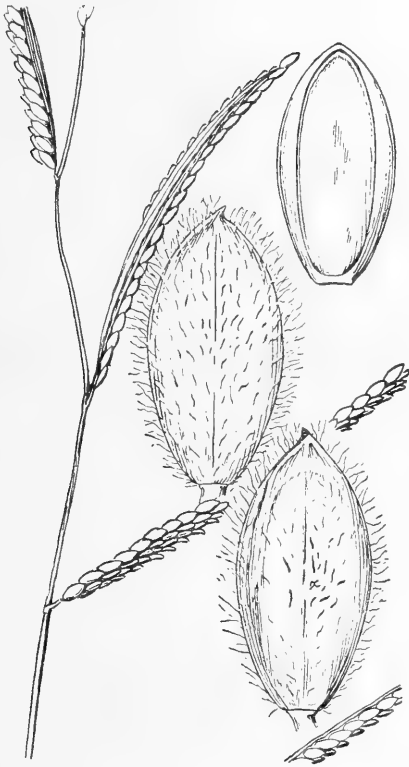


FIGURE 869.—*Paspalum hartwegianum*. Panicle, $\times 1$ two views of spikelet, and floret, $\times 10$. (Buckley, Tex.)

8. *Paspalum hartwegianum* Fourn. (Fig. 869.) Culms ascending from a decumbent base, 50 to 150 cm. tall; blades 10 to 35 cm. long, 2 to 6 mm. wide, the margins very scabrous; racemes usually 4 to 7, ascending, 2

to 9 cm. long; rachis 1 to 1.5 mm. wide; spikelets imbricate, about 3 mm. long, elliptic, apiculate, softly pubescent. 2 (*P. buckleyanum* Vasey.)—Wet prairies, alkaline meadows, and along irrigation ditches, sometimes growing in the water, southern Texas and throughout Mexico.

4. *Notáta*.—Culms in dense tufts, compressed, leafy at base; sheaths keeled; racemes 2, rarely 3, paired or nearly so; spikelets solitary, glabrous.

9. *Paspalum notátum* Flügge. BAHIA GRASS. (Fig. 870.) Culms 15 to 50 cm. tall from a short, stout, woody, horizontal rhizome; blades flat or folded; racemes recurved-ascending, usually 4 to 7 cm. long; spikelets

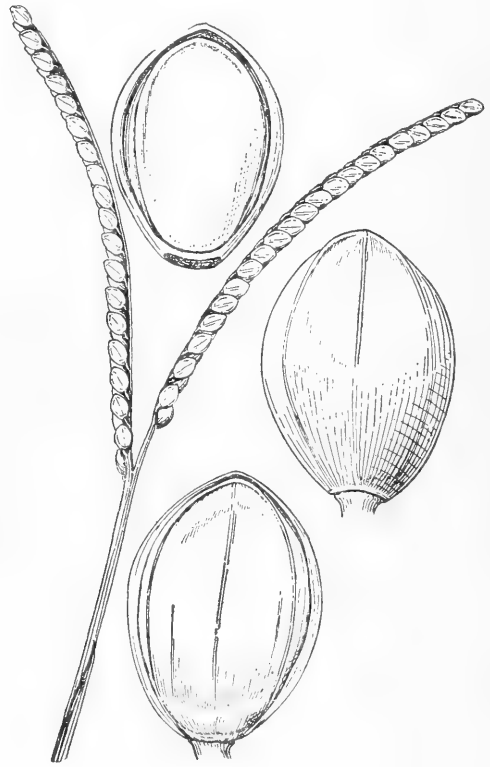


FIGURE 870.—*Paspalum notatum*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Chase 6639, P. R.)

ovate to obovate, 3 to 3.5 mm. long, smooth and shining. 2 —Introduced sparingly in New Jersey, North Carolina, Florida, Louisiana, and Texas; Mexico and the West Indies to South America.

PASPALUM NOTATUM var. **SAÚRAE** Parodi. A more hardy form, 40 to 70 cm. tall, with blades to 35 cm. long, the racemes 2 or 3, rarely to 5, suberect, the spikelets 2.8 to 3 mm. long, is showing promise of becoming an important forage and erosion-control grass in the Southern States. This has been found in lawns at Wilmington, N. C., Pensacola, Fla., and in several localities in Texas. It has been called the "Pensacola strain." An introduction from Paraguay belongs to this form and has come to be known as the "Paraguay strain." It has been confused with *Paspalum minus* Fourn., a distinct species that occurs in a few localities in Texas. 2 —Paraguay and Argentina.

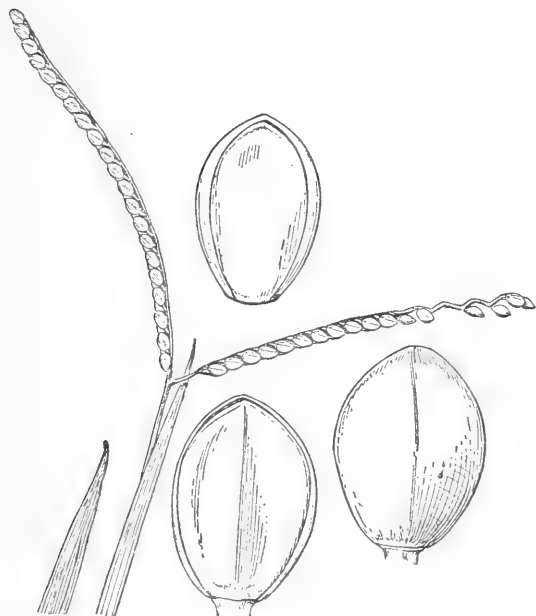


FIGURE 871.—*Paspalum minus*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Type coll.)

10. *Paspalum minus* Fourn. (Fig. 871.) Resembling *P. notatum*, commonly in denser mats; culms rarely more than 30 cm. tall; racemes more slender; spikelets 2 to 2.5 mm. long, less shining than those of *P. notatum*. 2 —Open slopes and savannas, eastern Texas; Mexico to West Indies and Paraguay.

11. *Paspalum álum* Chase. COMBS **PASPALUM.** (Fig. 872.) Culms in very dense tufts; blades flat, 2 to

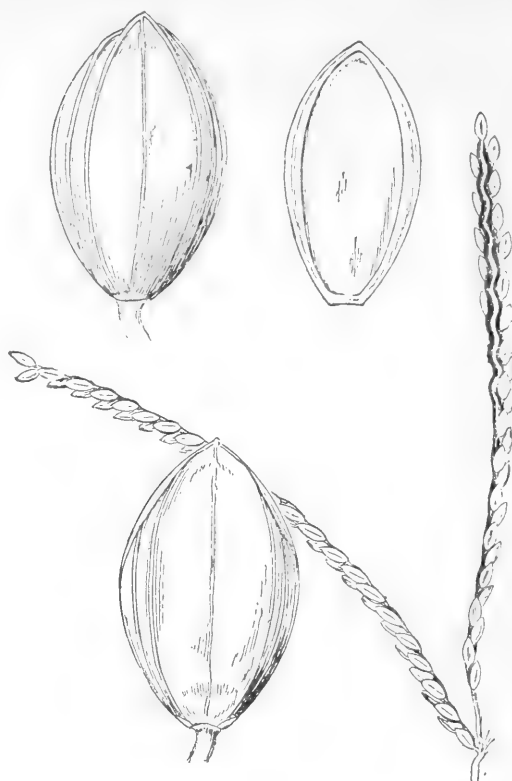


FIGURE 872.—*Paspalum álum*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Type.)

3 mm. wide, long-hirsute on the upper surface at base, papillose-hirsute on the lower surface toward the ends, the margins stiffly ciliate toward base; racemes slender, approximate, scarcely paired, occasionally 3, ascending, 5 to 9 cm. long; rachis 1 mm. wide, minutely wing-margined; spikelets 3 mm. long, 1.8 to 2 mm. wide, obovate-elliptic; sterile lemma slightly concave. 2 —Sandy or silty clay loam, Jefferson County, Tex.; Brazil, Paraguay, and Argentina. An excellent forage grass.

5. *Setácea*.—Culms compressed from a knotted base or very short rhizome; blades mostly flat; inflorescence terminal and axillary, the axillary sometimes hidden in the sheaths; racemes 1 to few, slender, subcylindric; spikelets in pairs, crowded. Species closely related with frequent intergrades.

12. *Paspalum longepedunculátum* LeConte. (Fig. 873.) Culms slender, ascending or suberect, 25 to 80 cm. tall; leaves mostly aggregate at the

base, the sheaths ciliate on the margin; blades usually folded at base, 4 to 10 cm. long, rarely longer, 3 to 8 mm. wide, stiffly papillose-ciliate on the margin, the hairs 1.5 to 3 mm. long; racemes on very slender finally elongate peduncles, 1 or 2, rarely 3, on the primary, 1 on the axillary peduncles; racemes arching, 3 to 8 cm. long; spikelets about 1.5 mm. long, elliptic-obovate, glabrous. 2 —Sandy soil, mostly in low pine land or flat woods, Virginia and Kentucky to Florida and Mississippi.

13. *Paspalum setaceum* Michx. (Fig. 874.) Culms slender, erect, usually 30 to 50 cm. tall; sheaths pilose;

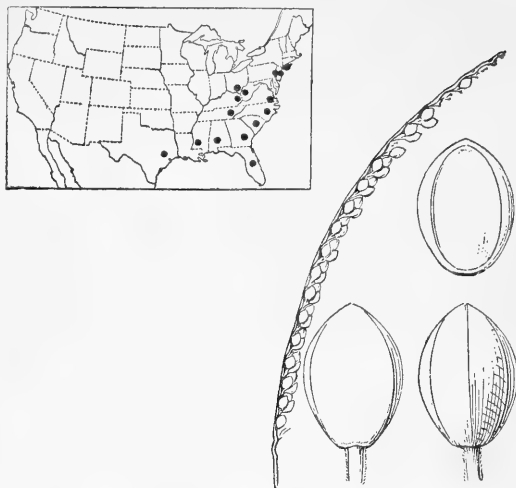


FIGURE 874.—*Paspalum setaceum*. Raceme, $\times 1$; two views of spikelet, and floret, $\times 10$. (Hitchcock 300, S. C.)

densely grayish villous, the blades on the average wider; racemes more commonly 2; spikelets 1.8 to 1.9 mm. long, pubescent. 2 —Sandy, mostly dry soil, barrens and flatwoods, Long Island to Florida and Texas; Mexico and Cuba.

15. *Paspalum supinum* Bosc ex Poir. (Fig. 876.) Culms relatively stout, widely spreading, 30 to 90 cm. tall; sheaths usually hirsute; blades 15 to 25 cm. long, 8 to 15 mm. wide, hirsute; racemes usually 2 to 4, rarely to 6, 4 to 10 cm. long; spikelets elliptic-obovate, 2 mm. long, gla-

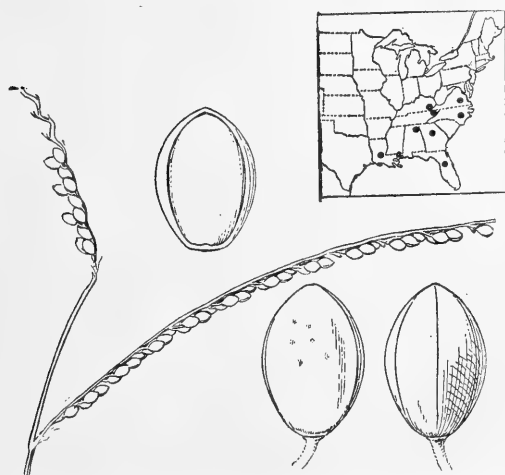


FIGURE 873.—*Paspalum longepedunculatum*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Nash 2074, Fla.)

blades rather firm, erect or nearly so, linear, about 10 to 12 cm. long, 2 to 6 mm. wide, densely pilose on both surfaces and papillose-ciliate on the margin; racemes on slender peduncles, solitary or sometimes 2, arching, 5 to 7 cm. long; spikelets elliptic-obovate, about 1.5 mm. long, glabrous or minutely pubescent. 2 —Sandy soil, usually open woods, mostly on or near the Coastal Plain, Long Island to Florida and Texas; Ohio and West Virginia to Tennessee; Mexico.

14. *Paspalum débile* Michx. (Fig. 875.) Differing from *P. setaceum* in the stouter, more spreading culms, the foliage more crowded at base,



FIGURE 875.—*Paspalum debile*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Nash 946, Fla.)

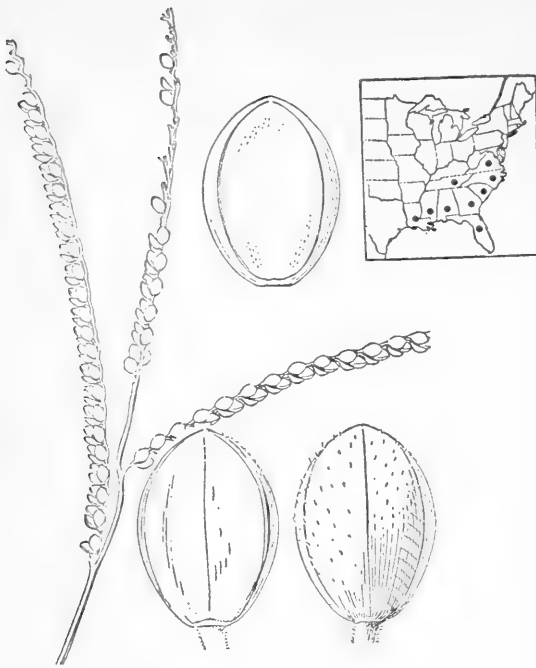


FIGURE 876.—*Paspalum supinum*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Chase 4572, N. C.)

17. *Paspalum stramineum* Nash. (Fig. 878.) Yellowish green, the culms erect, 40 to 100 cm. tall; blades 6 to 25 cm. long, rarely longer, 6 to 15 mm. wide, puberulent on both surfaces and sparsely pilose as well, or the lower surface nearly glabrous; racemes 2 or 3, rarely 4, 6 to 14 cm. long, the axillary often wholly or partly included in the sheaths, short racemes commonly borne in basal sheaths; spikelets suborbicular, 2.1 to 2.2 mm. long, pale, from densely pubescent to glabrous. 2 (P. bushii Nash.)—Sandy soil, in open ground or open woods, Indiana to Minnesota, Texas, Arizona, and northwestern Mexico.

18. *Paspalum pubescens* Muhl. (Fig. 879.) Culms ascending, 45 to 90 cm. tall, often pilose at the summit; sheaths usually pilose toward the summit; blades 8 to 20 cm. long,

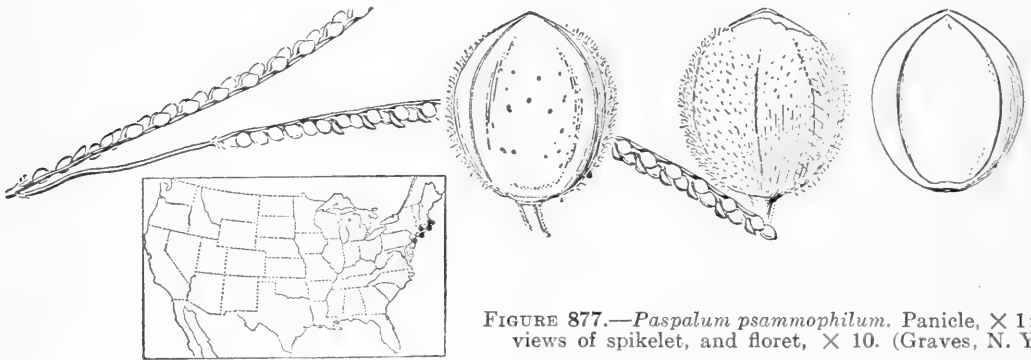


FIGURE 877.—*Paspalum psammophilum*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Graves, N. Y.)

brous, or the glume minutely pubescent. 2 —Dry, sandy, open ground and old fields, Virginia to Florida and west to Louisiana.

16. *Paspalum psammophilum* Nash. (Fig. 877.) Forming dense grayish-olivaceous mats, the culms usually prostrate, 25 to 100 cm. long; sheaths appressed-pubescent; blades 4 to 16 cm. long, 4 to 11 mm. wide, densely appressed-pubescent; racemes 1 to 3, commonly 2, 4 to 9 cm. long, the axillary ones wholly or partly included in the sheaths; spikelets suborbicular, 2 mm. long, the glume densely pubescent. 2 —Dry sandy soil, mostly near the coast, Massachusetts to New Jersey.

2 to 10 mm. wide (rarely larger), pilose on both surfaces; racemes 1 to 3, 4 to 17 cm. long; spikelets about 2 mm. long, suborbicular, usually glabrous. 2 (P. muhlenbergii Nash.)—Open ground or open woods, common in old fields and pastures, especially in sandy regions, Vermont to Florida, west to Michigan, Kansas, and Texas.

19. *Paspalum ciliatifolium* Michx. (Fig. 880.) Culms erect to spreading, 35 to 90 cm. tall; sheaths glabrous or the lower puberulent; blades 10 to 35 cm. long, 7 to 20 mm. wide (rarely larger), usually strongly ciliate along the margin and glabrous otherwise; racemes 1 to 3, usually 7 to 10 cm.

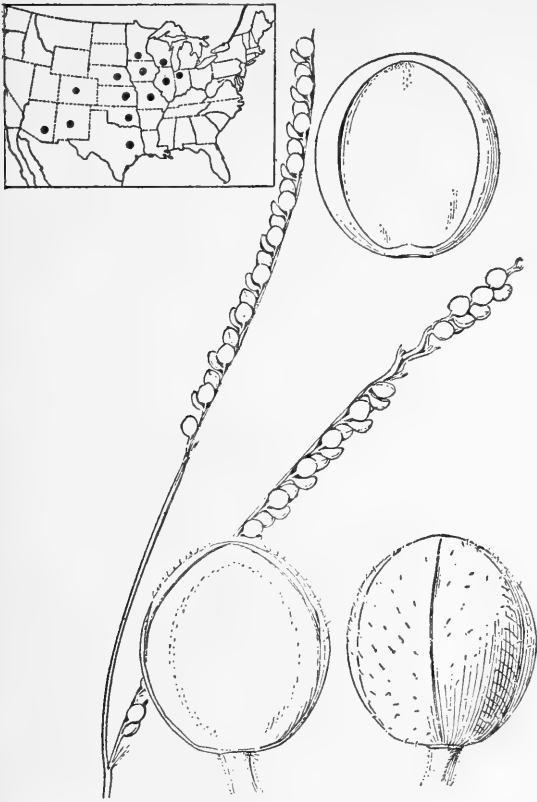


FIGURE 878.—*Paspalum stramineum*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Type.)

long; spikelets about 2 mm. long, suborbicular, the glumes often minutely pubescent. 2 (*P. chapmani* Nash; *P. eggertii* Nash; *P. blepharophyllum* Nash; *P. epile* Nash.)—Open ground or open woods, mostly sandy, New Jersey to Florida, Minnesota, Kansas, and Texas; Honduras and the West Indies. This species is exceedingly variable. Pubescence on foliage and spikelets varies in a single plant. Rather stout, somewhat paler, seacoast plants, with firmer blades scarcely ciliate, are the form described as *P. epile*. Plants with softly pubescent lower sheaths, and blades but slightly ciliate, are the form described as *P. eggertii*. The shape of the spikelet varies in a single raceme from elliptic-obovate to suborbicular. The spikelets tend to become rounder at maturity, but both mature and immature are found of both shapes.

20. *Paspalum propinquum* Nash. (Fig. 881.) Resembling *P. ciliati-*

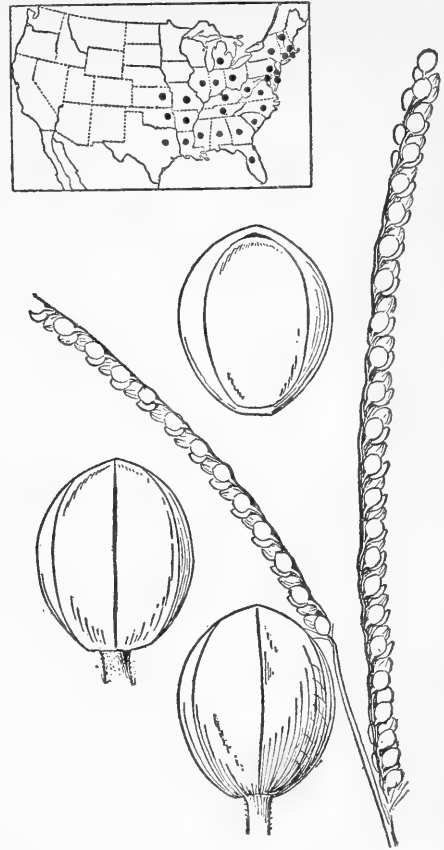


FIGURE 879.—*Paspalum pubescens*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Hitchcock 298, Ga.)

folium, the blades firmer and narrower, the spikelets slightly smaller,

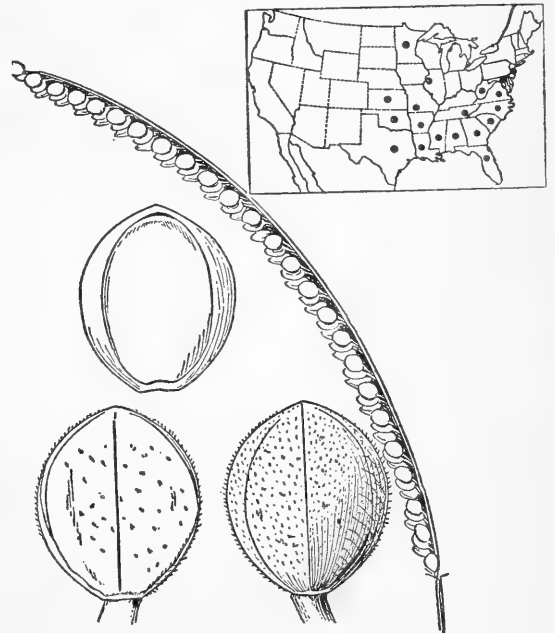


FIGURE 880.—*Paspalum ciliatifolium*. Raceme, $\times 1$; two views of spikelet, and floret, $\times 10$. (Nash 1426, Fla.)



FIGURE 881.—*Paspalum propinquum*. Two views of spikelet, and floret, $\times 10$. (Type.)

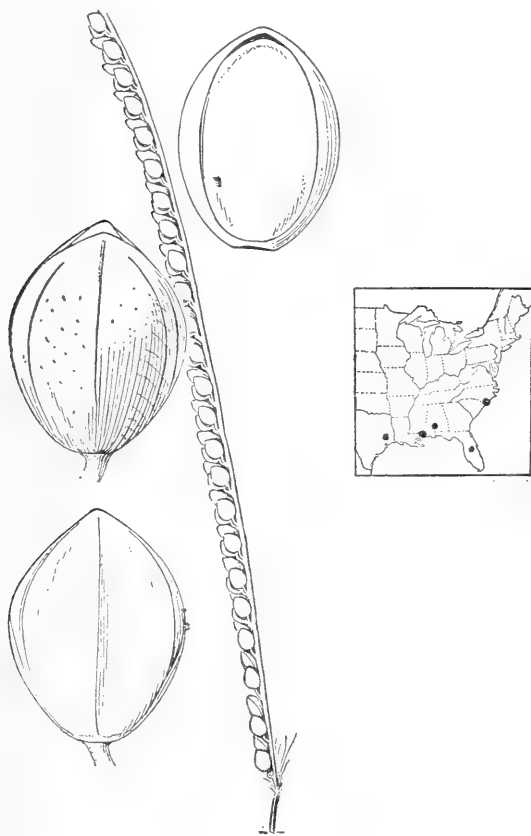


FIGURE 882.—*Paspalum rigidifolium*. Raceme, $\times 1$; two views of spikelet, and floret, $\times 10$. (Type.)

subacute. '21 —Sandy savannas and sand barrens overlying limestone, peninsular Florida; West Indies; Veracruz, Mexico, to Panama.

21. *Paspalum rigidifolium* Nash. (Fig. 882.) Culms erect, rather stiff, purplish, 25 to 75 cm. tall; sheaths glabrous or the lower grayish-pubescent; blades firm, linear, mostly 10 to 15 cm. long, 2 to 5 mm. wide, usually not wider than the summit of the sheath, glabrous or minutely

puberulent; racemes 1 or 2, 7 to 14 cm. long; spikelets usually 2.2 to 2.4 mm. long, obovate-elliptic, glabrous or nearly so, rarely pubescent. '21 —Sand barrens and high pineland, North Carolina and peninsular Florida to Texas.

6. *Dimorphostachys*.—Inflorescence terminal and axillary; racemes one to few, slender; spikelets in pairs, the first glume usually developed on one of the pair, often on both, or sometimes obsolete on both.

22. *Paspalum unispicatum* (Scribn. and Merr.) Nash. (Fig. 883.) Culms 1 to few in a tuft from horizontal scaly rhizomes, erect or ascending, 50 to 80 cm. tall, simple or with a

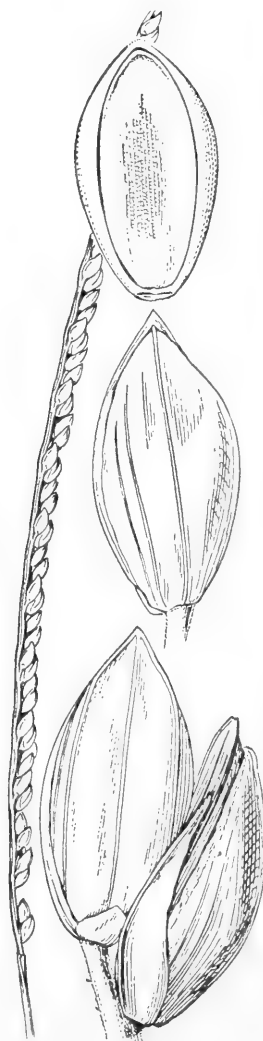


FIGURE 883.—*Paspalum unispicatum*. Raceme, $\times 1$; two views of spikelet, and floret, $\times 10$. (Type.)

single erect leafy branch; blades flat, rather stiff, 10 to 30 cm. long, 8 to 15 mm. wide, stiffly papillose-ciliate on the margin, sparsely papillose-hirsute on both surfaces, or scabrous only; racemes usually solitary, 1 terminal and 1 from the axil of the uppermost sheath, 6 to 20 cm. long; spikelets about 3.2 mm. long, elliptic; first glume on the primary spikelet minute, sometimes obsolete, on secondary spikelet mostly half to three-fourths as long as the spikelet. 2 —Meadows, savannas, open slopes, and banks, southern Texas to Venezuela and Argentina; Cuba.

23. *Paspalum monostachyum* Vasey. (Fig. 884.) Culms 1 to few from horizontal scaly rhizomes, erect, 50 to 120 cm. tall; blades elongate, slender, terete, firm; racemes 1 or 2, 10 to 30 cm. long; spikelets 3 to 3.5



FIGURE 884.—*Paspalum monostachyum*. Raceme, $\times 1$; two views of spikelet, and floret, $\times 10$. (Type.)



FIGURE 885.—*Paspalum lanzei*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Pringle 3991, Mexico.)

mm. long, subovate-elliptic, the pedicels of the pair nearly equal; first glume often developed in few to several of the primary spikelets, commonly wanting or rudimentary. 2 (*P. solitarium* Nash.)—Moist places in flatwoods or coastal dunes, southern Florida and Texas.

24. *Paspalum lanzei* (Fourn.) Nash. (Fig. 885.) Culms ascending, 30 to 100 cm. tall; blades flat, rather thin, 10 to 40 cm. long, 6 to 15 mm. wide, glabrous to sparsely pubescent, the lower tapering to a narrow base; peduncles 1 to 3 from the upper sheath, often also from middle sheaths; racemes 2 to 5, 4 to 10 cm. long; spikelets 2.2 to 2.6 mm. long, elliptic-obovate, pubescent and glandular-speckled; first glume minute or obsolete on the primary spikelet, one-fourth to one-third as long as the spikelet on the secondary. 2 (*Dimorphostachys ciliifera* Nash; *Paspalum ciliiferum* Hitchc.)—Moist woods and shaded slopes and banks, occasionally in open ground, mostly at low altitudes, Florida, Louisiana, Texas; Greater Antilles to Venezuela.



FIGURE 886.—*Paspalum blodgettii*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Simpson, Fla.)

7. **Caespitosa**.—Culms simple or with a single branch, its leaf sometimes hidden in the parent sheath, the inflorescence appearing to be axillary; racemes few to several.

25. ***Paspalum blodgettii*** Chapm. (Fig. 886.) Cespitose, with tough, commonly somewhat swollen and bulblike base, the scales densely pubescent; culms erect, slender, 40 to 100 cm. tall; lower leaves crowded; blades flat, 5 to 25 cm. long, mostly 5 to 10 mm. wide; racemes usually 3 to 8, slender, remote, 2 to 8 cm. long; spikelets about 1.3 mm. long, obovate, the glume glandular-pubescent. 2 (*P. simpsoni* Nash; *P. gracillimum* Nash.)—Open or brushy calcareous soil, southern Florida; Yucatan, Honduras, British Honduras, Bahamas, and the Greater Antilles.

26. ***Paspalum caespitosum*** Flüge. (Fig. 887.) Cespitose, bluish green; culms erect, rather wiry, 30 to 60 cm. tall; blades flat, folded or involute, 5 to 20 cm. long, rarely longer, 4 to 10 mm. wide; racemes usually 3 to 5, relatively thick, remote, ascending, 1.5 to 6 cm. long; spikelets 1.5 to 1.8 mm. long, elliptic, sparsely appressed-pubescent to nearly glabrous. 2 —Mostly in partly shaded humus in limestone soil or

rock, sometimes in sandy pinelands; southern Florida, Mexico, Central America, and the West Indies.

27. ***Paspalum laxum*** Lam. (Fig. 888.) Culms mostly 50 to 75 cm. tall, compressed, rigid, ascending; blades more or less involute, mostly 20 to 30 cm. long, 3 to 8 mm. wide, usually glabrous; racemes usually 3 to 5, mostly remote, 3 to 10 cm. long; spikelets about 2 mm. long, elliptic-obovate, the glume pubescent. 2 (*P. glabrum* Poir.)—Sandy and limestone soils, characteristic of coconut groves, Key West, Fla.; West Indies.

28. ***Paspalum pleostachyum*** Doell. (Fig. 889.) Culms 40 to 100 cm. tall, in rather large tough clumps, glabrous, or scabrous below the panicle, leafy; sheaths densely ciliate on the margins, villous across the collar, otherwise glabrous or sometimes papillose-hispid; blades as much as 55 cm. long, 4 to 8 mm. wide, flat or becoming folded, stiffly ascending, more or less pubescent above, the margins scabrous; racemes 3 to 15, ascending or stiffly spreading, 7 to 14 cm. long; spikelets 2.2 to 2.5 mm. long, elliptic-obovate, glabrous. 2 —On rocks or in sand or clay near the seacoast, Marathon Key, Fla.; Cuba to Brazil.



FIGURE 887.—*Paspalum caespitosum*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Poiteau, Dominican Republic.)

29. *Paspalum virletii* Fourn. (Fig. 890.) Culms 40 to 75 cm. tall; nodes, sheaths and blades softly pilose; blades flat, lax, 8 to 15 cm. long, 5 to 10 mm. wide, slightly narrowed to the base; racemes 4 or 5, slender, spreading, 2 to 7 cm. long, the margin of the slender rachis sometimes with a few long hairs; spikelets 2 mm. long, 1.5 mm. wide, broadly ovate; glume obscurely pubescent to glabrous. 2 —Sandy soil, bottom

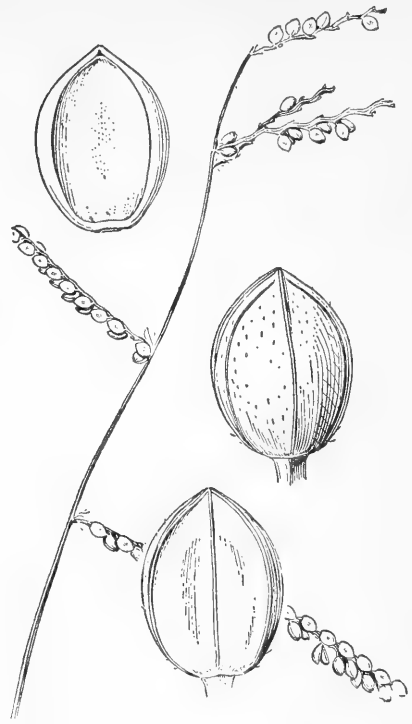


FIGURE 890.—*Paspalum virletii*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Type.)



FIGURE 888.—*Paspalum laxum*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Richard's specimen in Paris Herbarium.)



FIGURE 889.—*Paspalum pleostachyum*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Ekman 15756, Cuba.)

of Sycamore Canyon, near Ruby, Santa Cruz County, Ariz.; northern Mexico. Rare.

8. *Rupéstria*.—Tufted perennials with slender culms and narrow blades; racemes slender, usually solitary; spikelets minute.

30. *Paspalum saugétii* Chase. (Fig. 891.) Culms 15 to 40 cm. tall, slender, densely tufted, glabrous, the nodes appressed-pubescent; blades 3 to 15 cm. long, 3 to 7 mm. wide, flat, or involute in drying, rather thick, glabrous or sometimes sparsely pilose; racemes solitary, sometimes 2, 2 to 4

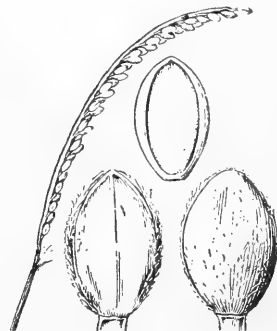


FIGURE 891.—*Paspalum saugétii*. Raceme, $\times 1$; two views of spikelet, and floret, $\times 10$. (Type.)



FIGURE 892.—*Paspalum conjugatum*. Plant, $\times \frac{1}{2}$; two views of spikelet, and floret, $\times 10$. (Baker 90, Cuba.)

cm. long, erect or falcate; spikelets solitary or paired, 1.3 to 1.6 mm. long, oval, blunt, appressed-pubescent. 2 —Rocky, mostly limestone soil, Florida (south of Royal Palm State Park) and the Greater Antilles.

9. *Conjugata*.—Stoloniferous; blades flat; racemes 2, paired, rarely a third below, slender; spikelets flattened concavo-convex, solitary, silky-fringed.

31. *Paspalum conjugatum* Bergius. (Fig. 892.) Extensively creeping, with long leafy stolons and ascending suberect flowering branches, 20 to 50 cm. tall; nodes of stolons usually conspicuously pilose; blades rather thin, 8 to 12 cm. long, 5 to 15 mm. wide, usually glabrous; racemes widely divaricate, 8 to 12 cm. long; spikelets 1.4 to 1.8 mm. long, ovate, light yellow, the margin conspicuously ciliate-fringed. 2 —A common weed in cultivated and waste ground, southern Florida to Texas, south to Argentina; West Indies; tropics of Old World.

10. *Dilatata*.—Rather stout, in leafy clumps; blades flat; racemes few to numerous, spikelets in pairs, flat, silky-fringed.

32. *Paspalum dilatatum* Poir. DALLIS GRASS. (Fig. 893.) Culms tufted, leafy at base, mostly 50 to 150 cm. tall, ascending or erect from a decumbent base; blades 10 to 25 cm. long, 3 to 12 mm. wide; racemes usually 3 to 5, spreading, 6 to 8 cm. long; spikelets ovate-pointed, 3 to 3.5 mm. long, fringed with long white silky hairs and sparsely silky on the surface. 2 —In low ground, from rather dry prairie to marshy meadows, New Jersey to Tennessee and Florida, west to Oklahoma and Texas; adventive in Oregon, Colorado, Arizona, and California; native of South America. Widely known as paspalum-grass, water-paspalum, water grass, or more commonly, simply paspalum. Introduced into the southern United States from Uruguay or Argentina

about the middle of the last century, now common throughout the Gulf States. Valuable pasture grass. Dallis grass was named for A. T. Dallis of La Grange, Ga., who grew it extensively.

33. *Paspalum urvillei* Steud. VASEY GRASS. (Fig. 894.) Culms in large clumps, erect, mostly 1 to 2 m. tall; lower sheaths coarsely hirsute or occasionally glabrous; blades mostly elongate, 3 to 15 mm. wide, pilose at base; panicle erect, 10 to 40 cm. long, of about 12 to 20 rather crowded, ascending racemes, 7 to 14 cm. long; spikelets 2.2 to 2.7 mm. long, ovate, pointed, fringed with long white silky hairs, the glume appressed-silky. 2 (*P. larranagai* Arech.; *P. vaseyanum* Scribn.)—Along ditches and roadsides and in waste ground, mostly in rather moist soil; Virginia to Florida and west to Texas; southern California, south to Argentina. Introduced from South America.

11. *Laevia*.—Rather tall, simple or occasionally with reduced flowering branches; blades mostly flat; racemes few to several; spikelets broadly oval to orbicular, depressed planoconvex, glabrous.

34. *Paspalum laeve* Michx. (Fig. 895.) Culms erect or ascending, leafy at base, 40 to 100 cm. tall; sheaths keeled, glabrous or nearly so; blades usually folded at base, flat or folded above, 5 to 30 cm. long, 3 to 10 mm. wide, glabrous to ciliate or sparsely pilose on the upper surface or sometimes toward the base beneath; racemes usually 3 or 4, spreading, 3 to 10 cm. long; spikelets broadly oval, 2.5 to 3 mm. long. 2 (*P. angustifolium* LeConte; *P. australe* Nash.)—Meadows, open woods, old fields, and waste ground, New Jersey to Ohio, Florida, Arkansas, and eastern Texas.

35. *Paspalum longipilum* Nash. (Fig. 896.) Similar to *P. laeve*, usually less leafy at base, sheaths and blades pilose; racemes somewhat more lax than in *P. laeve*. 2 (*P. plenipilum* Nash.)—Damp, mostly sandy soil, savannas, open woods, and wet pine



FIGURE 893.—*Paspalum dilatatum*. Plant, $\times \frac{1}{2}$; two views of spikelet, and floret, $\times 10$. (Hitchcock 297, La.)



FIGURE 894.—*Paspalum urvillei*. Plant, $\times \frac{1}{2}$; two views of spikelet, and floret, $\times 10$. (Chase 4388, La.)



FIGURE 895.—*Paspalum laeve*. Plant, $\times \frac{1}{2}$; two views of spikelet, and floret, $\times 10$. (Chase 2600, D. C.)

barrens, New York to Tennessee, Florida, Arkansas, and Texas.

36. *Paspalum circuláre* Nash. (Fig. 897.) Culms in dense leafy clumps, 30 to 80 cm. tall; sheaths pilose to

nearly glabrous; blades mostly erect, commonly about equaling the inflorescence, 15 to 30 cm. long, 5 to 10 mm. wide, usually pilose on the upper surface; racemes 2 to 7, mostly

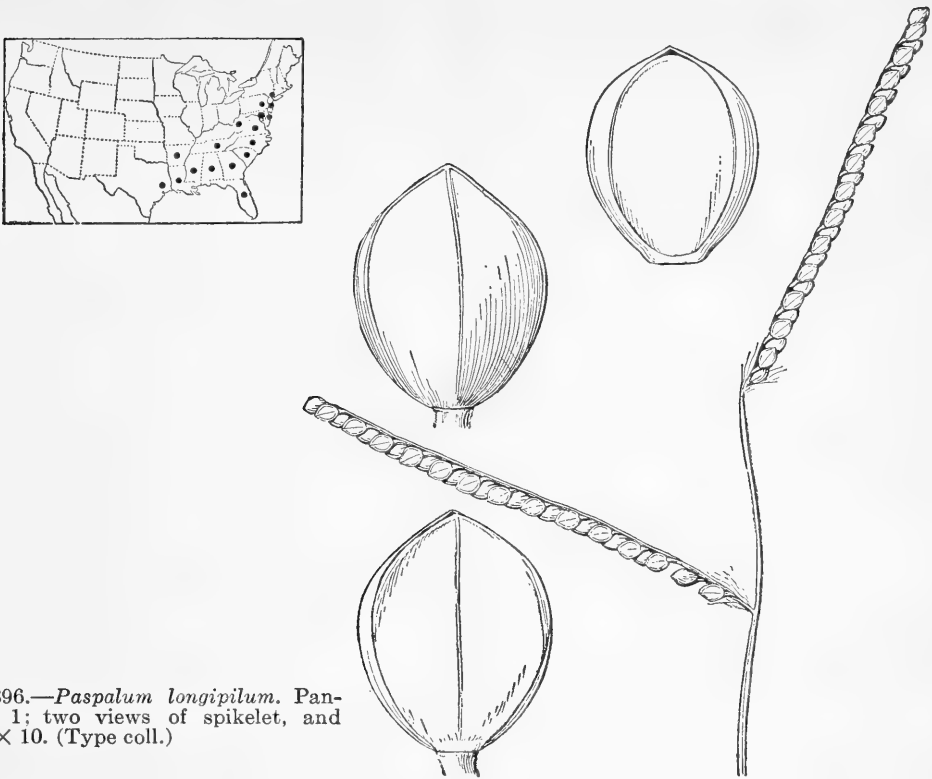


FIGURE 896.—*Paspalum longipilum*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Type coll.)

suberect, 5 to 12 cm. long; spikelets nearly orbicular, about 3 mm. long. 2 (P. *praelongum* Nash.)—Fields, meadows, and open waste ground, Massachusetts to Georgia and Mississippi, west to Kansas and Texas.

37. *Paspalum praecox* Walt. (Fig. 898.) Culms erect from short scaly rhizomes, 50 to 100 cm. tall; sheaths keeled, glabrous, or the lower villous; blades 15 to 25 cm. long, 3 to 7 mm. wide, glabrous or nearly so; racemes usually 4 to 6, ascending to arcuate-spreading, 2 to 7 cm. long, the common axis very slender; rachis about 1.5 mm. wide, purplish; spikelets usually solitary and paired in each raceme, strongly flattened, sub-orbicular, 2.2 to 2.8 mm. long, the glume and sterile lemma thin and fragile. 2 —Wet pine barrens, borders of cypress swamps, moist places in flatwoods, and wet savannas, in the Coastal Plain, North Carolina to central Florida and along the Gulf to Texas.

38. *Paspalum lentiferum* Lam. (Fig. 899.) Similar to *P. praecox*;

culms more robust, sometimes as much as 150 cm. tall; sheaths less strongly keeled; blades usually more or less pilose; racemes usually 4 or 5; spikelets 2.7 to 3.4 mm. long, broadly oval. 2 (P. *glaberrimum* Nash; P. *tardum* Nash; P. *kearneyi* Nash; P. *amplum* Nash.)—Moist pine barrens, borders of flatwoods, and cypress swamps, and in savannas on the Coastal Plain, from Virginia to southern Florida and along the Gulf to Texas.

12. Floridána.—Mostly robust, culms simple; blades mostly flat; racemes few; spikelets large, rather turgid, glabrous.

39. *Paspalum difforme* LeConte. (Fig. 900.) Culms solitary or few from a short knotty rhizome, rather stout, 35 to 75 cm. tall; leaves commonly crowded at the base; blades 10 to 15 cm. long, 5 to 10 mm. wide, usually pilose on the upper surface toward base; racemes 2 to 4, ascending to suberect, 3.5 to 8 cm. long; spikelets 3.5 to 4 mm. long, oval to obovate. 2 —Moist sandy soil in

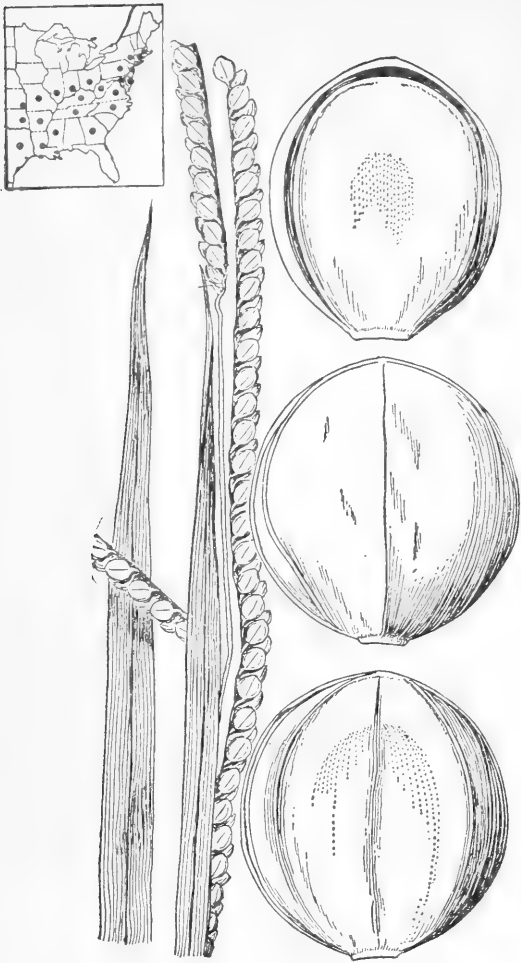


FIGURE 897.—*Paspalum circulare*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Chase 3836, Md.)

open ground and in flatwoods, in the Coastal Plain, South Carolina, to Orange County, Fla., and west near the Gulf to Louisiana.

40. *Paspalum floridanum* Michx. (Fig. 901.) Culms solitary or few from short stout scaly rhizomes, 1 to 2 m. tall; sheaths villous to nearly glabrous; blades firm, flat or folded, 15 to 50 cm. long, 4 to 10 mm. wide, usually villous at least on the upper surface toward base; racemes usually 2 to 5, 4 to 12 cm. long; spikelets crowded, oval, about 4 mm. long. $\text{\textcircled{2}}$ —Low moist sandy soil, pine woods, flatwoods, savannas, and low prairies, in the Coastal Plain from Maryland to central Florida and along the Gulf to Texas, north in the valleys to Missouri and Oklahoma. *PASPALUM FLORIDANUM* var. *GLABRÁTUM* Engelm. ex Vasey. More ro-

bust, taller; foliage glabrous or nearly so; racemes longer, more spreading. $\text{\textcircled{2}}$ —Brackish marshes and low, sandy, mostly open ground, southern New Jersey to central Florida, west to Kentucky, Illinois, southeastern Kansas, and Texas.

41. *Paspalum gigantéum* Baldw. ex Vasey. (Fig. 902.) Culms mostly solitary from short scaly rhizomes, erect, 1.5 to 2 m. tall; leaves numerous at base; blades elongate, 10 to 20 mm. wide, glabrous or nearly so; racemes commonly 3 or 4, 10 to 20 cm. long; spikelets oval, about 3.5 mm. long, usually russet-tinged. $\text{\textcircled{2}}$ (*P. longicilium* Nash.)—Moist sandy soil, open ground, stream banks, flatwoods, and hammocks, on the Coastal Plain from Georgia to southern Florida; Mississippi (Biloxi).

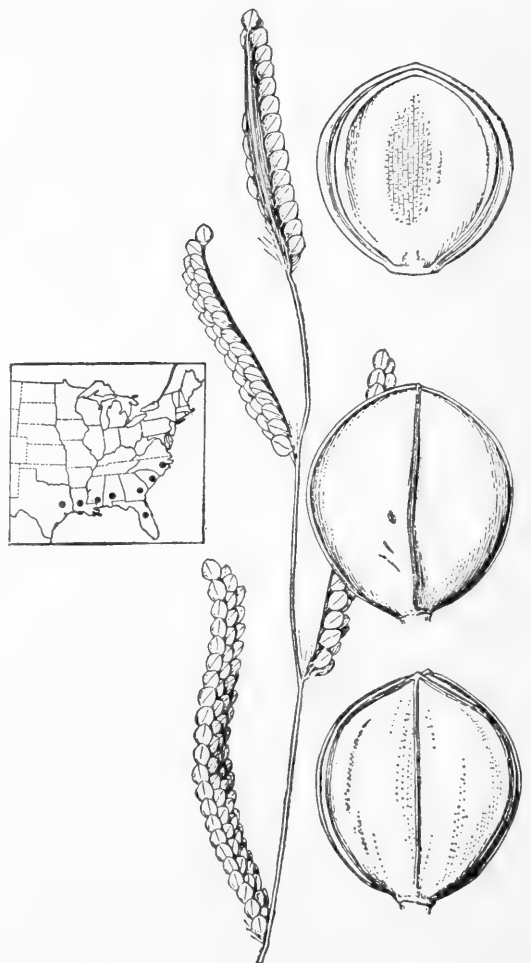


FIGURE 898.—*Paspalum praecox*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Stone 377, S.C.)

13. Virgáta.—Robust; blades firm with sharp-cutting edges; racemes several to numerous. Mostly tropical species.

42. *Paspalum virgátum* L. (Fig. 903.) Culms in large dense clumps, erect, 1 to 2 m. tall; sheaths papillose-hirsute at margin and summit; blades elongate, flat, 1 to 2.5 cm. wide; panicle slightly nodding, 15 to 25 cm. long; racemes usually 10 to 16, ascending or drooping, 5 to 15 cm. long; spikelets crowded, obovate, about 2.2 to 2.5 mm. long, brownish, pubescent along the margin at least toward the summit. 2 —Open, mostly moist or swampy ground, southern Texas (Brownsville) to South America; throughout the West Indies.

***Paspalum intermédium* Munro ex Morong.** Coarse, densely tufted perennial; sheaths compressed, keeled, the lower rather soft and papery; blades folded toward the base, the margins sharply hispid-serrate; panicle dense, the numerous racemes narrowly ascending or somewhat spreading; rachis rather prominently papillose-hispid-ciliate; spikelets about 2 mm. long, acute, glabrous, conspicuously purple-tinged. 2 —Introduced from South America. Escaped along roadsides near Tifton, Ga.

14. Plicátula.—Perennials and annuals with compressed purplish culms; blades flat or folded; racemes few to several; spikelets rather turgid, drab, turning brown or dark olivaceous; fruit dark brown, shining.

43. *Paspalum plicátulum* Michx. BROWNSEED PASPALUM. (Fig. 904.) Culms in small tufts with numerous leafy shoots, suberect, 50 to 100 cm. tall; blades folded at base, usually flat above, rather firm, elongate, 3 to 10 mm. wide, usually pilose near base; racemes mostly 3 to 10, arcuate-spreading, 3 to 10 cm. long; spikelets usually 2.5 to 2.8 mm. long, obovate-oval, brown at maturity, glabrous or the glume appressed-pubescent, the sterile lemma with short transverse wrinkles just inside the slightly raised

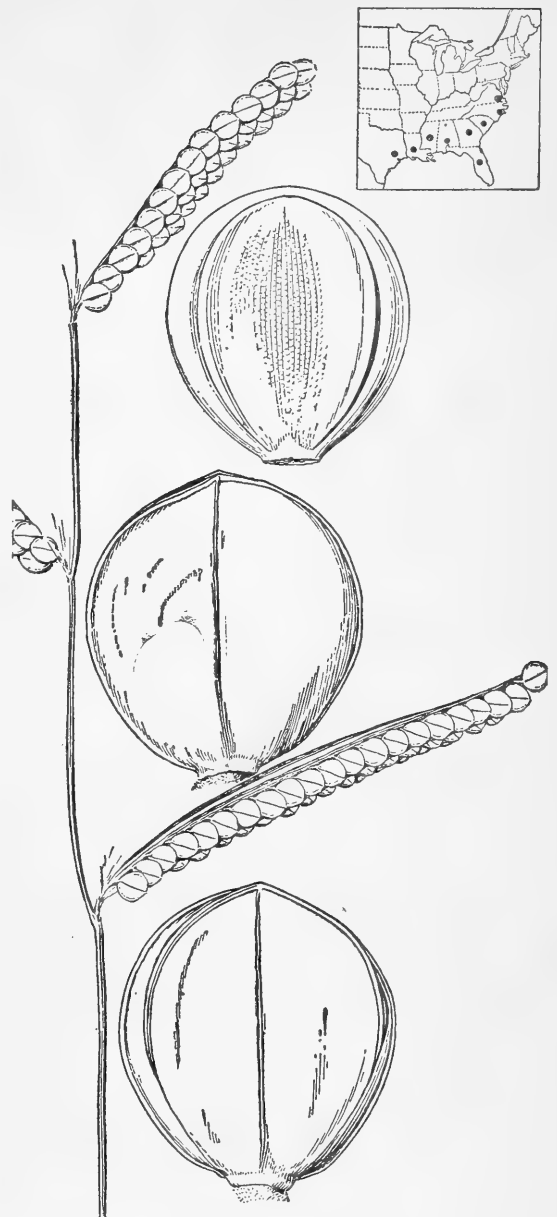


FIGURE 899.—*Paspalum lentiferum*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Harper 1629, Ga.)

margin. 2 —Open ground or wet wood borders, Georgia and Florida to Texas, south to Argentina; throughout the West Indies.

PASPALUM NICORAE Parodi. Widely creeping, branching rhizomes; culms slender, erect or ascending; sheaths and blades, at least the lower, sparsely pilose, the blades sometimes minutely pubescent on the upper surface; racemes 3 or 4, appressed or ascending, the axis and rachis slender; spikelets about 3 mm. long, similar to those of *P. plicátulum* but slightly narrower and the sterile lemma less wrinkled. 2 —Grown at the experiment station, Gainesville, Fla., the seed from southern Brazil.

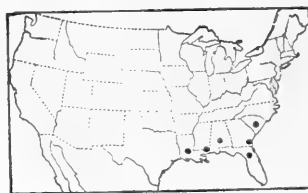
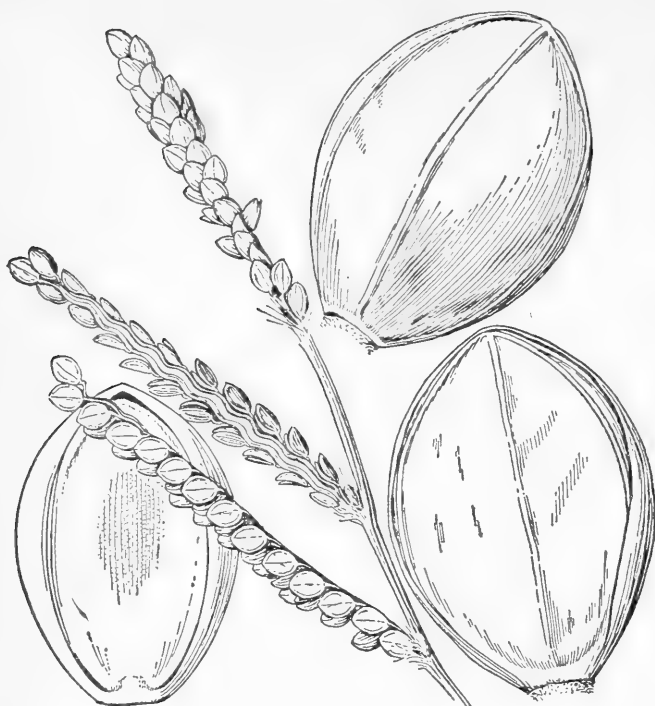


FIGURE 900.—*Paspalum difforme*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Type.)



44. *Paspalum texanum* Swallen. (Fig. 905.) Culms 70 to 110 cm. tall, erect or ascending from long rhizomes; sheaths much longer than the internodes, glabrous or papillose-hirsute toward the keeled summit, the uppermost bladeless; blades elongate, 2 to 6 mm. wide, flat, papillose-hirsute or papillose only to glabrous on both surfaces; racemes 4 to 6, ascending to suberect, 6 to 9 cm. long, the axis 6 to 13 cm. long; spikelets usually paired, 2.4 to 2.7 mm. long, 1.4 to 1.6 mm. wide, glabrous, the pedicels often to 2 mm. long; glume and sterile lemma thin, brownish, covering the fruit or slightly pointed beyond it, the lemma usually cross-wrinkled inside the margin; fruit 2.3 to 2.4 mm. long, chestnut brown at maturity. 2. —Moist ground, southeastern Texas.

45. *Paspalum hydróphilum* Henr. (Fig. 906.) Aquatic; culms compressed, the submerged part lush, 1 to 2.5 m. long, with tufts of long roots at the nodes; sheaths and blades glabrous, the blades flat, lax, 7 to 15 cm. long, 3 to 7 mm. wide, glabrous; racemes 2 or 3, ascending, 5 to 10

FIGURE 901.—*Paspalum floridanum*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Chase 4221, Fla.)

cm. long; spikelets mostly paired, 2.8 to 3 mm. long, 1.3 to 1.4 mm. wide, elliptic, glabrous; glume and sterile lemma thin, olive brown, covering the fruit or minutely pointed beyond it; fruit light brown at maturity. 2 —Irrigation ditches, Louisiana; southern Brazil and Paraguay.

46. *Paspalum bosciánium* Flügge. BULL PASPALUM. (Fig. 907.) Rather succulent annual, branching at base and commonly from the middle nodes, usually conspicuously brownish purple, glabrous as a whole; culms 40 to 60 cm. long, ascending or widely spreading; sheaths broad, loose; blades 10 to 40 cm. long, 8 to 15 mm. wide, papillose-pilose on upper surface near base; racemes 4 to 12, usually 4 to 7 cm. long; rachis 2 to 2.5 mm. wide; spikelets crowded, obovate-orbicular, 2 to 2.2 mm. long, glabrous, rust brown at maturity. ☉ (Depauperate specimens have been described as *P. scrobiculatum* L.)—Moist or wet open ground, along ditches and ponds, sometimes a weed in cultivated fields, Pennsylvania (ballast), Virginia to Florida, Louisiana, Arkansas, and Texas, south to Brazil.

47. *Paspalum convéxum* Humb. and Bonpl. ex Willd. (Fig. 908.) Culms



FIGURE 902.—*Paspalum giganteum*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Type.)

mostly 20 to 40 cm. tall, geniculate-ascending or widely spreading, leafy,

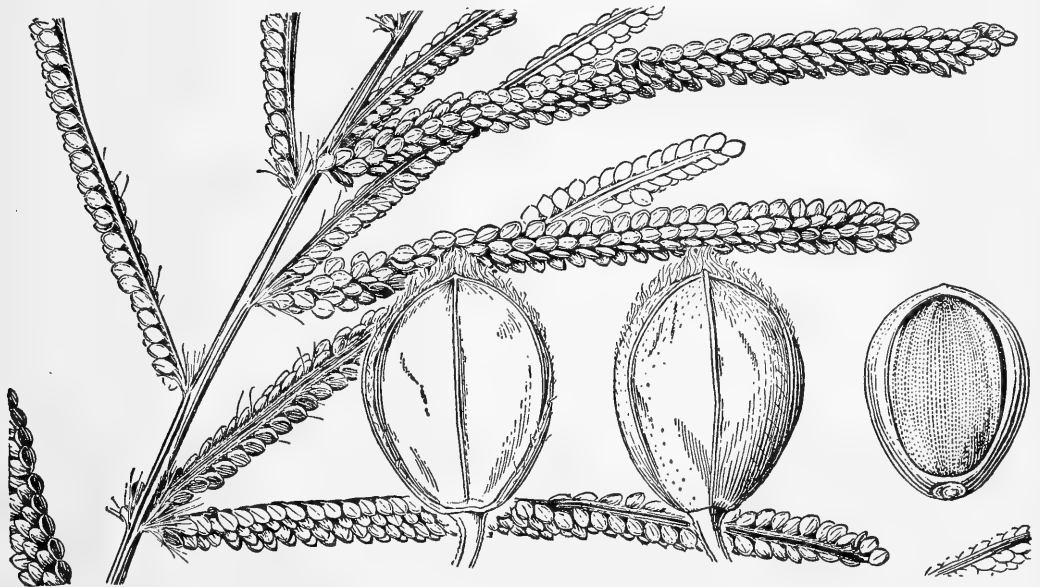


FIGURE 903.—*Paspalum virgatum*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Hitchcock 9555, Jamaica.)



FIGURE 904.—*Paspalum plicatulum*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Chase 7061, Ga.)

branching from the lower and middle nodes; leaves conspicuously papillose-pilose or sometimes nearly glabrous; racemes 1 to 4, ascending or spreading, 2 to 4 cm. long; spikelets 2.2 to 3 mm. long, obovate, pubescent to glabrous; fruit dark brown, shining. \odot —Roadsides, Texas (Jasper County); northern Mexico to Brazil; Cuba, Trinidad.

***Paspalum scrobiculatum* L.** Stouter and with larger spikelets, unequally biconvex, the sterile lemma loose and wrinkled. \odot —Ballast, Camden, N. J.; Abilene, Tex.; Asia; cultivated in India.

15. *Bífida*.—A single species approaching *Panicum*; spikelets turgid; a minute first glume usually developed.

48. *Paspalum bífidum* (Bertol.) Nash. (Fig. 909.) Culms erect from short rhizomes, 50 to 120 cm. tall; blades flat, 10 to 50 cm. long, 3 to 14 mm. wide, villous to nearly glabrous;

racemes usually 3 or 4, at first erect, 4 to 16 cm. long; rachis slender, subflexuous; spikelets distant to irregularly approximate, elliptic-obovate, 3.3 to 4 mm. (rarely to 4.2 mm.) long; second glume and sterile lemma conspicuously nerved. \odot —Sandy pine and oak woods, occasionally in hammocks, nowhere common, on the Coastal Plain from Virginia to Florida, Tennessee, Texas, and Oklahoma. A specimen from Virginia with villous foliage, long-exserted panicle, and spikelets 4.2 mm. long has been named *P. bifidum* var. *projectum* Fernald. The various differences, pubescence, long-exserted panicles, diverging lower raceme, spikelets 4.2 mm. long, and longer first glume are found, not coordinated, in occasional specimens throughout the range.

16. *Malacóphylla*.—A single species in North America; both glumes of spikelet suppressed (the second half as long as the spikelet in one species), the fertile



FIGURE 905.—*Paspalum texanum*. Panicle, $\times 1$; spikelet, and floret, $\times 10$. (Type.)



FIGURE 906.—*Paspalum hydrophilum*. Node with rootlets, and panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Silveus 4199, La.)

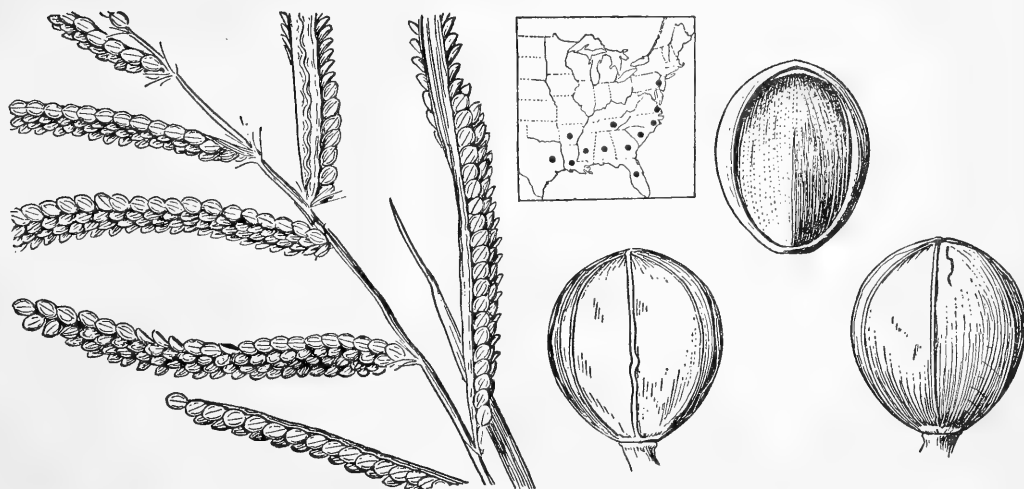


FIGURE 907.—*Paspalum boscianum*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Kearney 152, Fla.)



FIGURE 908.—*Paspalum convexum*. (Palmer 592 in 1886; Mexico.)

lemma strongly longitudinally ridged.

***Paspalum malacóphyllum* Trin.**

RIBBED PASPALUM. Culms rather coarse, 1 to 2 m. tall; blades flat, 8 to 35 mm. wide, the lower narrowed to a slender base; panicles nodding, the usually numerous racemes approximate; spikelets 1.8 to 2 mm. long, glabrous; second glume wanting; fertile lemma strongly ridged. 2 — Mexico to Bolivia and Argentina. Introduced in the Southern States. Occasionally grown for hay and sometimes used in soil conservation work.



FIGURE 909.—*Paspalum bifidum*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Curtiss 5590, Fla.)

137. PÁNICUM L. PANICUM

Spikelets more or less compressed dorsiventrally, in open or compact panicles, rarely racemes; glumes 2, herbaceous, nerved, usually very unequal, the first often minute, the second typically equaling the sterile lemma, the latter of the same texture and simulating a third glume, bearing in its axil a membranaceous or hyaline palea and sometimes a staminate flower, the palea rarely wanting; fertile lemma chartaceous-indurate, typically obtuse, the nerves obsolete, the margins inrolled over an enclosed palea of the same texture. Annuals or perennials of various habit. Type species, *Panicum miliaceum*. *Panicum*, an old Latin name for the common millet (*Setaria italica*).

Panicum miliaceum, proso millet, is cultivated to a limited extent in this country for forage. In Europe it is sometimes cultivated for the seed which is used for food. Two species are commonly cultivated in the lowland tropics for forage, *P. maximum*, Guinea grass, an African species, said to have been introduced into Jamaica in 1774, and *P. purpurascens*, Para grass, introduced into Brazil from Africa. Certain native species are constituents of wild hay or of

the range. *P. virgatum*, switch grass, and *P. stipitatum*, of the eastern half of the United States, *P. bulbosum* and *P. obtusum*, of the Southwest, and *Panicum texanum* in Texas furnish hay or forage. The seeds of *P. sonorum* Beal are used for food by the Cocopa Indians.

Axis of branchlets extending beyond the base of the uppermost spikelet as a point or bristle 1 to 6 mm. long..... SUBGENUS 1. PAUROCHAETIUM.

Axis of branchlets not extending into a bristle. (In *P. geminatum* and *P. paludivagum* the somewhat flattened axis is pointed but not bristle-form.)

Basal leaves usually distinctly different from those of the culm, forming a winter rosette; culms at first simple, the spikelets of the primary panicle not perfecting seed, later usually becoming much branched, the small secondary panicles with cleistogamous fruitful spikelets..... SUBGENUS 2. DICHANTHELIUM.

Basal leaves similar to the culm leaves, not forming a winter rosette; spikelets all fertile. SUBGENUS 3. EUPANICUM.

Subgenus 1. Paurochaetium

Blades elongate, usually more than 15 cm. long, narrowed toward the base.

Spikelets about 3.5 mm. long..... 3. *P. REVERCHONI*.

Spikelets about 2 mm. long, or less..... 1. *P. CHAPMANI*.

Blades usually less than 10 cm. long, not narrowed toward the base; spikelets 2.5 to 3 mm. long.

Blades of midculm long-acuminate, usually 2 to 4 mm. wide..... 2. *P. RAMISETUM*.

Blades of midculm abruptly acute, usually 4 to 7 mm. wide..... 4. *P. FIRMULUM*.

Subgenus 2. Dichanthelium

Blades elongate, not more than 5 mm. wide, 20 times as long as wide; autumnal phase branching from the base only (from the lower nodes in *P. werneri*).

1. *DEPAUPERATA*.

Blades not elongate (or if so, more than 5 mm. wide and autumnal phase not branching from base).

Plants branching from the base, finally forming rosettes or cushions, the foliage soft, lax.

Blades prominently ciliate except in *P. laxiflorum*..... 2. *LAXIFLORA*.

Plants branching from the culm nodes or rarely remaining simple.

Blades long, stiff; autumnal phase bushy-branched above.

Spikelets turgid, attenuate at base; mostly pustulose-pubescent; blades conspicuously striate, tapering from base to apex..... 3. *ANGUSTIFOLIA*.

Spikelets scarcely turgid, not attenuate at base; blades tapering to both ends.

4. *BICKNELLIANA*.

Blades not long and stiff (somewhat so in *P. oligosanthos*, *P. malacon*, *P. commonsianum*, and *P. equilaterale*); not bushy-branched.

Plants not forming a distinct winter rosette; spikelets attenuate at base, papillose.

14. *PEDICELLATA*.

Plants forming a distinct winter rosette; spikelets not attenuate at base.

Spikelets turgid, blunt, strongly nerved (not strongly turgid in *P. oligosanthos*); blades rarely as much as 1.5 cm. wide (sometimes 2 cm. in *P. ravenelii* and *P. xanthophyllum*).

Sheaths or some of them, papillose-hispid (sometimes all glabrous in *P. helleri*); spikelets 3 to 4 mm. long (2.7 to 3 mm. in *P. wilcoxianum*).

13. *OLIGOSANTHIA*.

Sheaths glabrous or minutely puberulent; spikelets 1.5 to 2.5 mm. long, asymmetrically pyriform; culms wiry..... 12. *LANCEARIA*.

Spikelets not turgid, blunt, nor strongly nerved (somewhat so in *P. roanokense* and *P. caerulescens*).

Ligule of conspicuous hairs, usually 3 to 5 mm. long.

Sheaths glabrous or only the lowermost somewhat pubescent..... 7. *SPRETA*.

Sheaths strongly pubescent..... 8. *LANUGINOSA*.

Ligule obsolete or nearly so (manifest in *P. oricola*, *P. tsugetorum*, and *P. curtifolium*).

Spikelets nearly spherical at maturity; blades glabrous, firm, cordate. Plants usually sparingly branching..... 10. *SPHAEROCARPA*.

Spikelets usually obovate or elliptic.

Blades of midculm elongate, less than 1.5 cm. wide. Culms usually tall; spikelets pointed, abruptly so in the velvety *P. scoparium*.

15. *SCOPARIA*.

Blades of midculm not elongate (somewhat so in *P. equilaterale*).

- Blades cordate, 1 to 3 cm. wide (5 to 12 mm. in *P. ashei*). Spikelets pubescent.
 Spikelets 2.5 to 3 mm. long. Sheaths glabrous or minutely puberulent.
 16. COMMUTATA.
 Spikelets 3 to 5 mm. long (sometimes but 2.7 mm. long in the hispid-sheathed *P. clandestinum*)..... 17. LATIFOLIA.
 Blades not cordate, less than 1 cm. wide.
 Sheaths crisp- or appressed-pubescent. Blades firm; spikelets pubescent.
 9. COLUMBIANA.
 Sheaths glabrous or ciliate only in autumnal phase (sparsely pilose in *P. curtifolium*, the lower velvety in *P. mattamuskeetense*, rarely pilose in *P. roanokense* and *P. caerulescens*).
 Vernal culms delicate (sometimes scarcely so in *P. albomarginatum* and *P. tenue*); spikelets 1.5 mm. or less long (1.6 to 1.7 mm. in *P. tenue*)..... 11. ENSIFOLIA.
 Vernal culms slender but not delicate, rarely less than 40 cm. tall; spikelets 2 to 2.9 mm. long (1.5 mm. in *P. microcarpon* and *P. caerulescens*).
 Lower internodes short, upper elongate, producing a nearly naked culm, leafy at base; spikelets narrowly ovate, 2.7 to 2.9 mm. long..... 5. NUDICAULIA.
 Lower internodes not shorter, the vernal culms about evenly leafy throughout; spikelets elliptic or obovate, not more than 2.5 mm. long..... 6. DICHOTOMA.

1. *Depauperata*

- Spikelets about 3.5 mm. long, beaked..... 5. *P. DEPAUPERATUM*.
 Spikelets 3 mm. long or less (sometimes 3.2 mm. long in *P. perlongum*), not beaked.
 Culms single or few in a tuft; spikelets turgid, blunt, 2.7 to 3.2 mm. long, prairie plants.
 6. *P. PERLONGUM*.
 Culms in large tufts; spikelets not turgid, 2.2 to 2.7 mm. long; plants of woods.
 Sheaths pilose; spikelets 2.2 to 2.7 mm. long, pilose..... 7. *P. LINEARIFOLIUM*.
 Sheaths glabrous; spikelets 2.2 to 2.3 mm. long, glabrous or sparingly pilose.
 8. *P. WERNERI*.

2. *Laxiflora*

- Sheaths retrorsely pilose; spikelets papillose-pilose.
 Blades ciliate and more or less pilose on the surface; spikelets 2 mm. long.
 10. *P. XALAPENSE*.
 Blades glabrous or nearly so on the surface and margin; spikelets 2.2 mm. long.
 9. *P. LAXIFLORUM*.
 Sheaths not retrorsely pilose; spikelets pubescent or glabrous.
 Spikelets pubescent, about 2 mm. long..... 11. *P. CILIATUM*.
 Spikelets glabrous.
 Blades glabrous on the surface..... 12. *P. POLYCAULON*.
 Blades pilose on the surface..... 13. *P. STRIGOSUM*.

3. *Angustifolia*

- Nodes bearded; plants grayish-villous; autumnal blades flat.
 Spikelets 2 mm. long..... 16. *P. CHRYSOPSIDIFOLIUM*.
 Spikelets 2.5 to 2.8 mm. long..... 17. *P. CONSANGUINEUM*.
 Nodes not bearded; plants villous only at base, or nearly glabrous; autumnal blades involute or flat.
 Autumnal blades flat; lower panicle branches spreading or reflexed, or loosely ascending.
 Spikelets 2 mm. long; panicle branches loosely ascending..... 15. *P. BENNETTENSE*.
 Spikelets 2.5 to 2.8 mm. long; panicle branches widely spreading at anthesis.
 18. *P. ANGUSTIFOLIUM*.
 Autumnal blades involute; lower panicle branches more or less ascending.
 Spikelets pointed beyond the fruit, fusiform.
 Spikelets 3.3 to 3.5 mm. long..... 20. *P. FUSIFORME*.
 Spikelets mostly 2.3 to 2.5 mm. long (or to 3 mm. before maturity).
 19. *P. PINETORUM*.
 Spikelets not pointed beyond the fruit; obovate.
 Plants glabrous or nearly so. Autumnal culms erect.
 Spikelets subsecund along the suberect panicle branches.... 23. *P. NEURANTHUM*.

- Spikelets not subsecund, the panicle loose and open..... 22. *P. OVINUM*.
 Plants pubescent, at least on the lower half.
 Spikelets about 2.4 mm., rarely only 2.1 mm., or as much as 2.8 mm., long;
 vernal blades 7 to 12 cm. long; autumnal blades not falcate.
 21. *P. ARENICOLOIDES*.
 Spikelets not more than 2 mm. long; vernal blades 4 to 6 cm. long; autumnal blades
 much crowded, falcate..... 14. *P. ACICULARE*.

4. *Bicknelliana*

- Spikelets 2.5 to 2.8 mm. long; blades not more than 9 mm. wide..... 24. *P. BICKNELLII*.
 Spikelets 3 mm. long; blades as much as 12 mm. wide..... 25. *P. CALLIPHYLLUM*.

5. *Nudicaulia*

- A single species..... 26. *P. NUDICAULE*.

6. *Dichotoma*

- 1a. Nodes, at least the lower, bearded.
 Spikelets 1.5 to 1.6 mm. long, glabrous (occasional individuals with pubescent spikelets).
 27. *P. MICROCARPON*.
 Spikelets 2 mm. long or more.
 Spikelets glabrous, 2 mm. long.
 Autumnal phase erect, branched like a little tree; primary blades rarely more than
 5 mm. wide..... 33. *P. DICHOTOMUM*.
 Autumnal phase top-heavy-reclining; primary blades 6 to 10 mm. wide.
 34. *P. BARBULATUM*.
 Spikelets pubescent.
 Blades all velvety; autumnal phase branching from upper nodes.
 29. *P. ANNULATUM*.
 Blades glabrous or nearly so, or only the lowermost velvety.
 Primary blades mostly erect; autumnal phase sparingly branching, the branches
 erect; blades and panicles not much reduced..... 32. *P. BOREALE*.
 Primary blades spreading; blades and panicles of autumnal phase much reduced.
 Spikelets 2 mm. long; autumnal phase profusely branching.... 28. *P. NITIDUM*.
 Spikelets 2.2 mm. long or more; autumnal phase less profusely branching.
 Sheaths and upper nodes glabrous..... 31. *P. CLUTEI*.
 Lower sheaths and all nodes pubescent..... 30. *P. MATTAMUSKEETENSE*.
 1b. Nodes not bearded.
 2a. Spikelets pubescent.
 Culms erect, never becoming vinelike.
 Primary blades spreading; panicles purplish; fruit exposed at summit.
 31. *P. CLUTEI*.
 Primary blades erect; panicles green; fruit covered (woods forms with spreading
 blades may be distinguished from *P. dichotomum* by pubescent spikelets, 2.2 mm.
 long)..... 32. *P. BOREALE*.
 Culms soon prostrate, vinelike, the branches divaricate.
 Plants bright green, culms lax; spikelets not more than 2.1 mm. long.
 38. *P. LUCIDUM*.
 Plants grayish green, culms stiff; spikelets 2.5 mm. long..... 39. *P. SPHAGNICOLA*.
 2b. Spikelets glabrous.
 Culms soon prostrate.
 Plants bright green, culms lax; spikelets not more than 2.1 mm. long.
 38. *P. LUCIDUM*.
 Plants grayish green, culms stiff; spikelets 2.5 mm. long..... 39. *P. SPHAGNICOLA*.
 Culms erect, or the autumnal phase topheavy, never prostrate.
 Spikelets not more than 1.6 mm. long; panicles narrow; plants glaucous bluish green.
 37. *P. CAERULESCENS*.
 Spikelets 2 mm. long or more; panicles open.
 Blades erect, firm; spikelets turgid, strongly nerved; plants grayish olive green.
 36. *P. ROANOKENSE*.
 Blades spreading; spikelets not turgid.
 Spikelets 2.2 mm. long or more, pointed; sheaths bearing pale glandular spots.
 35. *P. YADKINENSE*.
 Spikelets not more than 2 mm. long, not pointed.
 Autumnal phase erect, branched like a little tree; primary blades rarely more
 than 5 mm. wide; second glume shorter than fruit and sterile lemma.
 33. *P. DICHOTOMUM*.

Autumnal phase topheavy-reclining; primary blades 6 to 10 mm. wide; second glume equaling fruit and sterile lemma..... 34. *P. BARBULATUM*.

7. *Spreta*

- Panicle narrow, one-fourth to one-third as wide as long..... 40. *P. SPRETUM*.
 Panicle open, two-thirds as wide as long, or more.
 Spikelets 1.5 mm. long..... 41. *P. LINDHEIMERI*.
 Spikelets 1.3 mm. long or less.
 Culms and sheaths glabrous..... 43. *P. LONGILIGULATUM*.
 Culms and sheaths appressed-pubescent.
 Spikelets 1.2 to 1.3 mm. long..... 42. *P. LEUCOTHRIX*.
 Spikelets not more than 1 mm. long..... 44. *P. WRIGHTIANUM*.

8. *Lanuginosa*

- 1a. Spikelets not more than 2 mm. long.
 2a. Plants grayish, velvety-pubescent.
 Spikelets 1.3 to 1.5 mm. long; autumnal blades involute-pointed (see also *P. albe-marlense*)..... 51. *P. AUBURNE*.
 Spikelets 1.8 to 2 mm. long; autumnal blades flat.
 Plants dark or olive green when dry; spikelets 1.9 to 2 mm. long.... 52. *P. THUROWII*.
 Plants light or yellow green when dry.
 Autumnal phase prostrate, branching from base and lower nodes, forming close mats; blades not ciliate. Around hot springs..... 57. *P. THERMALE*.
 Autumnal phase ascending or spreading, branching from middle and upper nodes, the reduced, fascicled blades strongly ciliate..... 50. *P. LANUGINOSUM*.
 2b. Plants pubescent, often villous, but not velvety.
 3a. Culms conspicuously pilose with long, horizontally spreading hairs. Culms branching before expansion of primary panicles..... 53. *P. PRAECOCIUS*.
 3b. Culms variously pubescent, if pilose the hairs not long and horizontally spreading.
 4a. Vernal blades glabrous or nearly so on the upper surface, firm in texture.
 Autumnal culms branching from the lower nodes, forming a spreading bunch 10 to 15 cm. high; Pacific slope..... 55. *P. OCCIDENTALE*.
 Autumnal culms branching from the middle nodes, forming widely spreading mats; Atlantic slope (see also form of *P. huachucae* var. *fasciculatum*).
 49. *P. TENNESSEENSE*.
 4b. Vernal blades pubescent on upper surface, sometimes pilose near base and margins only.
 5a. Spikelets 1.3 to 1.5 mm. long; vernal blades long-pilose on upper surface.
 Autumnal phase widely decumbent-spreading, forming a mat; vernal culms soon geniculate-spreading; plants olivaceous..... 46. *P. ALBEMARLENSIS*.
 Autumnal phase erect or leaning, never forming a mat; plants yellowish green.
 Axis of panicle pilose, panicle branches tangled, the lower drooping.
 47. *P. IMPLICATUM*.
 Axis of panicle puberulent only, panicle branches not tangled, the lower ascending..... 45. *P. MERIDIONALE*.
 5b. Spikelets 1.6 to 2 mm. long; vernal blades pilose or pubescent.
 Upper surface of blades pilose; spikelets 1.8 to 2 mm. long; autumnal phase decumbent-spreading.
 Spikelets pointed; culms weak and lax..... 58. *P. LANGUIDUM*.
 Spikelets obtuse; culms not weak and lax.
 Culms leafy below, branching from base and lower nodes; Maine to Minnesota..... 54. *P. SUBVILLOSUM*.
 Culms evenly leafy, branching from upper nodes; Pacific slope.
 56. *P. PACIFICUM*.
 Upper surface of blades appressed-pubescent or pilose toward the base only; spikelets 1.6 to 1.8 mm. long; autumnal phase not decumbent-spreading.
 48. *P. HUACHUCAE*.
 1b. Spikelets 2.2 mm. long or more.
 Spikelets 2.2 to 2.5 mm. long.
 Pubescence on culms horizontally spreading; autumnal phase freely branching.
 59. *P. VILLOSISSIMUM*.
 Pubescence on culms appressed or ascending; autumnal phase rather sparingly branching.
 Upper internodes shortened, the leaves approximate, the blades often nearly equaling the panicle.
 Blades glabrous or nearly so on the upper surface; spikelets 2.2 to 2.5 mm. long; first glume glabrous..... 60. *P. BENNERI*.

- Blades sparsely hispid on the upper surface; spikelets 2.2 to 2.3 mm. long; first glume pubescent..... 63. *P. SCOPARIOIDES*.
 Upper internodes not shortened, the copious pubescence silky. 61. *P. PSEUDOPUBESCENS*.

Spikelets 2.7 to 2.9 mm. long.

- Culms stiff; blades conspicuously ciliate; southern Atlantic coast..... 62. *P. OVALE*.
 Culms weak; blades not ciliate; Pacific coast..... 64. *P. SHASTENSE*.

9. *Columbiana*

1a. Spikelets 2 to 3.2 mm. long, mostly elliptic.

- Winter blades 5 to 10 cm. long; spikelets 2 mm. long; plants blue-green. 69. *P. WILMINGTONENSE*.

Winter blades 1 to 3 cm. long.

- Spikelets 3.2 mm. long; first glume conspicuously distant..... 65. *P. MALACON*.

Spikelets not more than 2.9 mm. long; first glume not distant.

- Spikelets 2.8 to 2.9 mm. long; vernal blades 8 to 15 cm. long..... 66. *P. DEAMIL*.

Spikelets not more than 2.4 mm. long; vernal blades not more than 8 cm. long.

- Spikelets about 2.4 mm. (2.2 to 2.4 mm.) long; panicle open, the branches stiffly spreading..... 67. *P. COMMONSIANUM*.

Spikelets 2 to 2.1 mm. long; panicle rather dense, the branches ascending.

68. *P. ADDISONII*.

1b. Spikelets not more than 1.9 mm. long, obovate, turgid.

Culms crisp-puberulent or appressed-pubescent with crimped hairs; plants bluish or grayish green; panicle about 3 to 7 cm. long.

- Spikelets 1.8 to 1.9 mm. long..... 70. *P. TSUGETORUM*.

- Spikelets 1.5 to 1.6 mm. long..... 71. *P. COLUMBIANUM*.

Culms appressed or ascending-pilose; plants olivaceous; panicle rarely more than 3 cm. long. Spikelets not more than 1.5 mm. long, rounded and turgid.

- Spikelets 1.5 mm. long; culms rather stout; autumnal phase branching from all the nodes..... 72. *P. ORICOLA*.

- Spikelets 1.3 to 1.4 mm. long; culms very slender; autumnal phase with branches mostly aggregate toward the summit..... 71. *P. COLUMBIANUM* var. *THINIUM*.

10. *Sphaerocarpa*

Culms spreading; blades obscurely nerved; panicle nearly as broad as long.

73. *P. SPHAEROCARPON*.

Culms erect or ascending; blades rather strongly nerved; panicle never more than two-thirds as broad as long, usually less.

Spikelets 1.5 to 1.6 mm. long; blades lanceolate, the upper not reduced.

74. *P. POLYANTHES*.

Spikelets 1 to 1.2 mm. long; blades tapering from base to apex, the upper much smaller than the lower..... 75. *P. ERECTIFOLIUM*.

11. *Ensifolia*

Ligules about 1 mm. long; sheaths or some of them sparsely spreading-pilose.

83. *P. CURTIFOLIUM*.

Ligules obsolete or nearly so; pubescence if present not spreading.

Blades prominently white-margined, firm; spikelets densely puberulent.

- Blades puberulent beneath, often above; sheaths and sometimes lower internodes ascending-pubescent..... 76. *P. TENUE*.

Blades glabrous; sheaths glabrous or minutely ciliate only.

- Uppermost culm blades much reduced; culms branching from lower nodes only, the branches repeatedly branching..... 77. *P. ALBOMARGINATUM*.

- Uppermost culm blades about as long as the others; culms bearing short branches from the upper and middle nodes..... 78. *P. TRIFOLIUM*.

Blades not white-margined or very obscurely so (or if white margin evident spikelets only 1.1 mm. long); spikelets glabrous or puberulent.

- Culms branching only at base; plants soft, light green..... 82. *P. VERNALE*.

Culms branching at the nodes; plants firm or at least not soft.

Spikelets glabrous.

Spikelets 1.1 to 1.2 mm. long; blades rarely as much as 5 cm. long.

84. *P. CHAMAEOLONCHE*.

Spikelets 1.2 to 1.5 mm. long.

Blades elongate, at least some of them 8 to 10 cm. long.

85. *P. GLABRIFOLIUM*.

- Blades not more than 3 cm. long..... 81. *P. ENSIFOLIUM*.

- Spikelets puberulent.
Spikelets 1.1 mm. long. Winter blades bluish green, not glossy. 80. *P. CONCINNUS*.
Spikelets 1.3 to 1.5 mm. long.
Blades involute, falcate, with long stiff hairs on margin near base. Plants stiff and wiry..... 86. *P. BREVE*.
Blades not involute, or at tip only, not falcate.
Plants bright green; winter blades conspicuous, glossy green. 79. *P. FLAVOVIRENS*.
Plants olive; winter blades not conspicuous nor glossy.... 81. *P. ENSIFOLIUM*.

12. *Lancearia*

- Spikelets, 1.5 to 1.6 mm. long..... 87. *P. PORTORICENSE*.
Spikelets 2 mm. long or more.
Blades, or some of them, at least 8 mm. wide, glabrous on the upper surface; fruit papillose-roughened..... 90. *P. WEBBERIANUM*.
Blades not more than 6 mm. wide (or if wider, puberulent on the upper surface); fruit smooth and shining.
Spikelets 2.4 to 2.6 mm. long. Blades narrowed toward the base. 91. *P. PATENTIFOLIUM*.
Spikelets not more than 2.1 mm. long.
Blades firm, glabrous above; culms stiffly ascending..... 88. *P. LANCEARIUM*.
Blades lax, softly puberulent on both surfaces; culms decumbent.... 89. *P. PATULUM*.

13. *Oligosanthia*

- Nodes bearded; blades velvety-pubescent beneath.
Plants lax, soft-velvety throughout; spikelets not more than 3 mm. long. 93. *P. MALACOPHYLLUM*.
Plants stiff, pubescence harsh; spikelets about 4 mm. long..... 97. *P. RAVENELII*.
Nodes not bearded (or but obscurely so in *P. wilcoxianum*); blades not velvety.
Panicle narrow, branches erect, or spreading only at anthesis. Blades erect.
Spikelets not more than 3 mm. long; blades not more than 6 mm. wide. 92. *P. WILCOXIANUM*.
Spikelets 3.7 to 4 mm. long; blades 8 to 20 mm. wide.
Blades papillose-hispid..... 98. *P. LEIBERGII*.
Blades glabrous on both surfaces..... 99. *P. XANTHOPHYSUM*.
Panicle about as wide as long.
Spikelets narrowly obovate, subacute; plants olivaceous, appressed-pubescent. 96. *P. OLIGOSANTHES*.
Spikelets broadly obovate, turgid, blunt; plants green, the pubescence, if present, not appressed.
Blades erect, not more than 6 mm. wide; plants copiously hirsute throughout. 92. *P. WILCOXIANUM*.
Blades ascending or spreading, rarely less than 8 mm. wide, usually wider; plants not hirsute throughout.
Spikelets 3.2 to 3.3 mm. long; blades firm; sheaths or some of them more or less hispid..... 95. *P. SCRIBNERIANUM*.
Spikelets not more than 3 mm. long; blades rather thin; sheaths, or some of them, glabrous or sparsely hispid..... 94. *P. HELLERI*.

14. *Pedicellata*

- Culms erect or leaning; blades thin, 5 to 9 cm. long, narrowed toward the base. 100. *P. PEDICELLATUM*.
Culms decumbent; blades thick, not more than 5 cm. long, not narrowed toward the base. 101. *P. NODATUM*.

15. *Scoparia*

- Pubescence soft-villous or velvety. Spikelets abruptly pointed..... 102. *P. SCOPARIUM*.
Pubescence when present not velvety.
Spikelets elliptic.
Spikelets 3 mm. long; second glume and sterile lemma pointed beyond the fruit. 103. *P. ACULEATUM*.
Spikelets not more than 2.8 mm. long; second glume and sterile lemma scarcely, if at all, pointed beyond the fruit.

Culms glabrous; sheaths not viscid-spotted; spikelets 2.2 to 2.9 mm. long, sparsely pubescent..... 104. *P. RECOGNITUM*.

Culms pilose with ascending hairs, the nodes densely pubescent; sheaths conspicuously viscid-spotted; spikelets 1.8 to 2.2 mm. long, densely pubescent.

105. *P. MUNDUM*.

Spikelets ovate, that is, broadest below the middle.

Sheaths or some of them hispid, rarely glabrous; autumnal phase with crowded branchlets..... 106. *P. SCABRIUSCULUM*.

Sheaths glabrous; autumnal phase sparingly branching..... 107. *P. CRYPTANTHUM*.

16. *Commutata*

Plants glaucous, glabrous; basal blades conspicuously ciliate; vernal culms usually solitary.

110. *P. MUTABILE*.

Plants not glaucous.

Blades nearly linear, that is, with parallel margins; first glume about half as long as the spikelet..... 112. *P. EQUILATERALE*.

Blades lanceolate.

Culms crisp-puberulent; blades usually rigid, symmetrical, rarely more than 10 mm. wide; spikelets about 2.5 mm. long..... 108. *P. ASHEL*.

Culms glabrous or softly puberulent; blades firm or lax; spikelets 2.7 to 3.2 mm. long.

Culms erect, or autumnal phase leaning; blades symmetrical, broadly cordate.

109. *P. COMMUTATUM*.

Culms decumbent; blades usually asymmetrical and falcate, narrowed to the scarcely cordate base..... 111. *P. JOORII*.

17. *Latifolia*

Sheaths strongly papillose-hispid, at least the lower and those of the branches.

113. *P. CLANDESTINUM*.

Sheaths glabrous or softly villous.

Nodes glabrous; spikelets 3.4 to 3.7 mm. long..... 114. *P. LATIFOLIUM*.

Nodes bearded; spikelets 4 to 4.5 mm. long..... 115. *P. BOSCHII*.

Subgenus 3. *Eupanicum*

1a. Plants annual.

Inflorescence consisting of several more or less secund spikelike racemes; fruit transversely rugose..... 3. *FASCICULATA*.

Inflorescence a more or less diffuse panicle.

Spikelets tuberculate..... 13. *VERRUCOSA*.

Spikelets not tuberculate.

First glume not more than one-fourth the length of the spikelet, truncate or triangular-tipped..... 4. *DICHOTOMIFLORA*.

First glume usually as much as half the length of the spikelet, acute or acuminate.

Blades linear; spikelets more than 1.7 mm. long, the second glume and sterile lemma pointed beyond the fruit..... 5. *CAPILLARIA*.

Blades ovate-lanceolate; spikelets about 1.3 mm. long, the second glume and sterile lemma not pointed beyond the fruit..... 7. *TRICHOIDEA*.

1b. Plants perennial.

2a. Spikelets short-pedicel along one side of the rachises, forming spikelike racemes (compare *Agrostoidia* with 1-sided but not spikelike panicle branches).

First glume nearly equaling the sterile lemma.

Racemes spreading; fruit not more than one-third the length of the spikelet.

17. *GYMNOCARPA*.

Racemes appressed; fruit nearly as long as the spikelet..... 15. *OBTUSA*.

First glume much shorter than the sterile lemma.

Fruit transversely rugose.

Nodes glabrous..... 1. *GEMINATA*.

Nodes bearded..... 2. *PURPURASCENTIA*.

Fruit not rugose..... 16. *HEMITOMA*.

2b. Spikelets in open or sometimes contracted or congested panicles (somewhat 1-sided in *Agrostoidia*).

Fruit transversely rugose (obscurely so in *P. plenum*)..... 8. *MAXIMA*.

Fruit not transversely rugose.

Spikelets villous..... 14. *URVILLEANA*.

Spikelets glabrous.

Sterile palea enlarged and indurate at maturity, expanding the spikelet. Blades

scarcely wider than their sheaths; spikelets about 2.3 mm. long, borne toward the ends of the few slender branches..... 12. *LAXA*.
Sterile palea, if present, not enlarged.

Plants with conspicuous creeping scaly rhizomes.

Spikelets long-pediceled, not secund, arranged in an open or contracted panicle..... 9. *VIRGATA*.

Spikelets short-pediceled, more or less secund along the nearly simple panicle branches..... 11. *AGROSTOIDIA*.

Plants without creeping scaly rhizomes.

Panicles narrow and few-flowered; culms erect and wiry; blades drying involute..... 10. *TENERA*.

Panicles open or contracted, many-flowered.

Spikelets short-pediceled along the nearly simple panicle branches.

11. *AGROSTOIDIA*.

Spikelets long-pediceled, the panicle open..... 6. *DIFFUSA*.

1. *Geminata*

Spikelets 3 mm. long; glumes and sterile lemma papery..... 117. *P. PALUDIVAGUM*.

Spikelets not more than 2.4 mm. long; glumes and sterile lemma not papery.

116. *P. GEMINATUM*.

2. *Purpurascens*

A single species..... 118. *P. PURPURASCENS*.

3. *Fasciculata*

Spikelets 5 to 6 mm. long..... 124. *P. TEXANUM*.

Spikelets 2 to 4 mm. long.

Spikelets strongly reticulate-veined, 2 to 3 mm. long, glabrous.... 120. *P. FASCICULATUM*.

Spikelets scarcely reticulate-veined or only near apex.

Spikelets not more than 2 mm. long, glabrous..... 119. *P. REPTANS*.

Spikelets more than 3 mm. long, pubescent.

Rachis scabrous but not bristly; spikelets acuminate-pointed, 4 to 4.5 mm. long.

121. *P. ADSPERSUM*.

Rachis and/or pedicels bristly-hirsute; spikelets acute, pubescent, or sometimes glabrous, 3 to 4 mm. long.

Rachis and pedicels bristly-hirsute; blades lanceolate, rarely more than 7 mm. wide.

123. *P. ARIZONICUM*.

Rachis scabrous, only the pedicels bristly-hirsute; blades ovate-lanceolate, as much as 2 cm. wide..... 122. *P. RAMOSUM*.

4. *Dichotomiflora*

Plants perennial; blades elongate, 2 to 3 mm. wide..... 127. *P. LACUSTRE*.

Plants annual; blades mostly 5 to 15 mm. wide.

Sheaths glabrous..... 125. *P. DICHOTOMIFLORUM*.

Sheaths papillose..... 126. *P. BARTOWENSE*.

5. *Capillaria*

Panicles drooping; spikelets 4.5 to 5 mm. long..... 138. *P. MILIACEUM*.

Panicles erect; spikelets not more than 4 mm. long.

Panicles more than half the length of the entire plant.

Panicles narrow, usually less than half as broad as long..... 128. *P. FLEXILE*.

Panicles as broad as long.

Fruit without scar at base..... 133. *P. CAPILLARE*.

Fruit with a lunate scar at base..... 134. *P. HILLMANI*.

Panicles not more than one-third the entire height of the plant.

Spikelets not more than 2.2 mm. long, acute but not long-acuminate (see also *P. hirsutum*).

Culms relatively stout; blades about 1 cm. wide; spikelets turgid.

129. *P. GATTINGERI*.

Culms slender; blades not more than 6 mm. wide; spikelets not turgid.

Spikelets 1.7 mm. long; foliage green.

Axillary pulvini pilose..... 130. *P. PHILADELPHICUM*.

Axillary pulvini glabrous..... 132. *P. TUCKERMANI*.

Spikelets 2.1 to 2.2 mm. long; foliage conspicuously tinged with purple, the blades erect..... 131. *P. LITHOPHILUM*.

Spikelets 2.7 to 4 mm. long, acuminate.

First glume about one-third the length of the spikelet, subacute or blunt.

137. *P. STRAMINEUM*.

First glume usually more than half the length of the spikelet, acuminate.

First glume more than three-fourths the length of the spikelet; spikelets 4 mm. long.

136. *P. PAMPINOSUM*.

First glume half to two-thirds the length of the spikelet; spikelets not more than

3.3 mm. long..... 135. *P. HIRTICAULE*.

6. *Diffusa*

Second glume and sterile lemma elongate, at least three times as long as the fruit.

139. *P. CAPILLARIOIDES*.

Second glume and sterile lemma not elongate.

Culms as much as 1 cm. thick; blades 2 cm. wide or more 144. *P. HIRSUTUM*.

Culms slender; blades not more than 1 cm. wide.

Spikelets 4 to 4.2 mm. long; midnerves of glumes and sterile lemma scabrous toward the apex..... 142. *P. LEPIDULUM*.

Spikelets usually less than 3.5 mm. long.

Blades hirsute on both surfaces (sometimes glabrescent), not at all glaucous.

143. *P. GHIESBREGHTII*.

Blades glabrous on both surfaces or with a few hairs on either surface, glaucous above.

Panicle much exceeding the leaves; spikelets 3 to 3.5 mm. long (rarely 3.7 mm.).

141. *P. HALLII*.

Panicle usually equaled or exceeded by the uppermost blades; spikelets 2 to 2.6 mm.

long..... 140. *P. FILIPES*.

7. *Trichoidea*

A single species..... 145. *P. TRICHOIDES*.

8. *Maxima*

Culms with a cormlike base..... 148. *P. BULBOSUM*.

Culms not cormlike at base.

Nodes hirsute; ligules 4 to 6 mm. long; fruit strongly rugose..... 146. *P. MAXIMUM*.

Nodes glabrous; ligules 2 mm. long; fruit obscurely rugose..... 147. *P. PLENUM*.

9. *Virgata*

Spikelets not more than 2.5 mm. long, first glume less than half the length of the spikelet.

Panicle loosely flowered; first glume truncate, about one-fifth the length of the spikelet.

149. *P. REPENS*.

Panicle rather densely flowered; first glume triangular, about one-third the length of the spikelet..... 150. *P. GOUINI*.

Spikelets 3 to 7 mm. long (sometimes less than 3 mm. in *P. virgatum* var. *cubense*); first glume more than half the length of the spikelet.

Panicle elongate, strongly contracted; seacoast plants.

Culms rarely 1 m. tall, solitary from the nodes of the horizontal rhizome.

153. *P. AMARUM*.

Culms 1 to 2 m. tall, in dense tufts..... 154. *P. AMARULUM*.

Panicle diffuse, or only slightly contracted; plants sometimes of salt marshes but not littoral.

Spikelets 6 to 8 mm. long; culms solitary, with a creeping base.... 152. *P. HAVARDII*.

Spikelets less than 5 mm. long (in exceptional specimens 6 mm. long); culms erect, producing numerous scaly rhizomes..... 151. *P. VIRGATUM*.

10. *Tenera*

A single species..... 155. *P. TENERUM*.

11. *Agrostoides*

Rhizomes present; culms but little compressed; spikelets set obliquely on the appressed pedicels.

Panicles open; spikelets 3.4 to 3.8 mm. long (shorter in exceptional specimens).

162. *P. ANCEPS*.

Panicles more or less contracted; spikelets not more than 2.8 mm. long.

163. *P. RHIZOMATUM*.

Rhizomes wanting; culms strongly compressed with keeled sheaths; spikelets not obliquely disposed (except in *P. abscissum*).

- Ligule ciliate; basal leaves half as long as the culm or more; panicle much exceeding the upper leaves.
Spikelets not more than 2.7 mm., usually 2.5 mm. long, the first glume less than half that length; ligule 2 to 3 mm. long..... 160. *P. LONGIFOLIUM*.
Spikelets 3 to 3.5 mm. long; first glume two-thirds to three-fourths that length; ligule less than 1 mm. long..... 161. *P. COMBSII*.
Ligule erose or lacerate, not ciliate; basal leaves in short tufts, the upper usually nearly equaling the terminal panicle.
Fruit stipitate; spikelets 2.5 to 2.8 mm. long, conspicuously secund..... 159. *P. STIPITATUM*.
Fruit not stipitate; spikelets not conspicuously secund.
Sheaths much broader at the summit than the base of the blades, truncate or auriculate..... 156. *P. ABSCISSUM*.
Sheaths about as wide at the summit as the base of the blades.
Spikelets 1.8 to 2 mm., in occasional specimens 2.2 mm. long; panicle branches ascending or spreading..... 157. *P. AGROSTOIDES*.
Spikelets about 2.5 mm. long; panicle branches erect or nearly so..... 158. *P. CONDENSUM*.

12. *Laxa*

- A single species..... 164. *P. HIAN*S.

13. *Verrucosa*

- Spikelets about 2 mm. long, glabrous, warty..... 165. *P. VERRUCOSUM*.
Spikelets more than 3 mm. long, hispid..... 166. *P. BRACHYANTHUM*.

14. *Urvilleana*

- A single species..... 167. *P. URVILLEANUM*.

15. *Obtusa*

- A single species..... 168. *P. OBTUSUM*.

16. *Hemitoma*

- A single species..... 159. *P. HEMITOMON*.

17. *Gymnocarpa*

- A single species..... 170. *P. GYMNOCARPON*.

SUBGENUS 1. PAUROCHAÉTIIUM Hitchc. and Chase

Perennials; culms tufted, erect, blades not more than 7 mm. wide; panicle slender, the branches short, appressed, the ultimate branchlets bearing 1 to several spikelets, produced beyond the uppermost spikelet as a bristle 1 to 6 mm. long; spikelets much swollen on the face, glabrous, strongly nerved; fruit transversely rugose, apiculate.

1. *Panicum chapmáni* Vasey. (Fig. 910.) Culms ascending or spreading, slender, wiry, 40 to 100 cm. tall; blades erect, rather firm, 15 to 40 cm. long, 2 to 5 mm. wide, more or less involute when dry; panicle mostly 20 to 30 cm. long; bristle 3 to 6 mm. long; spikelets 2 to 2.2 mm. long,

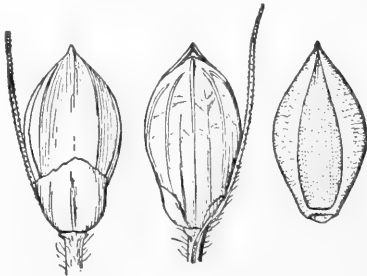


FIGURE 910.—*Panicum chapmáni*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Type.)

obovate; first glume about one-third as long as the spikelet, obtuse or truncate. 2 —Coral sand and shell mounds, southern Florida; Bahamas; Yucatan.

2. *Panicum ramiséti* Scribn. (Fig. 911.) Culms erect or ascending from short horizontal rhizomes, 25 to

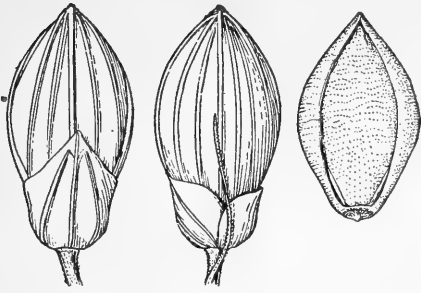


FIGURE 911.—*Panicum ramisetum*. Two views of spikelet, and floret, $\times 10$. (Type.)

60 cm. tall; blades 5 to 12 cm. long, 2 to 4 mm. wide; panicle 5 to 20 cm.

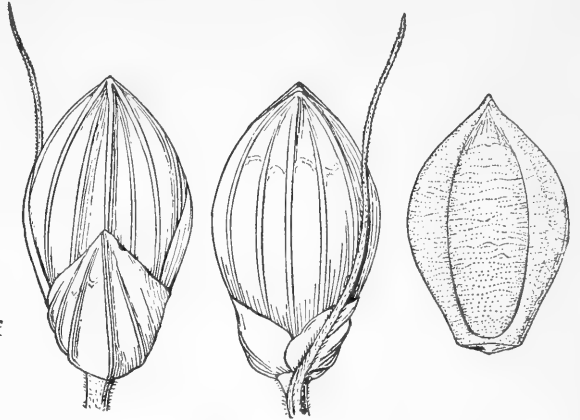


FIGURE 913.—*Panicum firmulum*. Two views of spikelet, and floret, $\times 10$. (Type.)

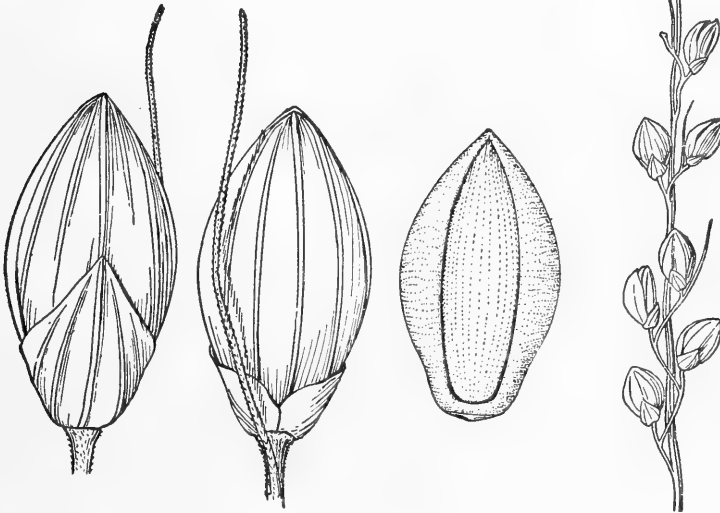


FIGURE 912.—*Panicum reverchoni*. Panicle, $\times 2$; two views of spikelet, and floret, $\times 10$. (Type.)

long; bristle not exceeding the spikelet; spikelets about 2.5 mm. long, obovate; first glume about half as long as the spikelet. 2 —Sandy plains and prairies, southern Texas and northern Mexico.

3. *Panicum reverchoni* Vasey. (Fig. 912.) Culms stiffly erect, from short rhizomes, 30 to 70 cm. tall; blades erect, stiff, 5 to 20 cm. long, 2 to 3 mm. wide; panicle 5 to 20 cm. long; spikelets 1 to 4 to a branchlet, the bristle equaling or exceeding the spikelet; spikelets 3.5 to 3.8 mm. long, elliptic; first glume about half as long

as the spikelet. 2 —Rocky or sandy prairies and limestone hills, Texas.

4. *Panicum firmulum* Hitchc. and Chase. (Fig. 913.) Culms ascending or decumbent at base, 30 to 40 cm. tall, rather loosely tufted from creeping knotted rhizomes as much as 5 cm. long; blades ascending or spreading, firm, 4 to 10 cm. long, 4 to 7 mm. wide; bristle 1 to 2 times as long as the spikelet; spikelets 3 to 3.2 mm. long, obovate; first glume half as long as the spikelet. 2 —Sandy prairies, southern Texas.

SUBGENUS 2. *DICHANTHÉLIUM* Hitchc. and Chase

Perennial, from a crown, rarely from short matted rhizomes, surrounded by a more or less well-marked rosette of usually short winter leaves, in spring producing simple culms with mostly narrowly lanceolate blades and terminal panicles with numerous spikelets, these rarely perfecting seed (or occasionally in *Lanuginosa* group and in *P. clandestinum*); early culms branching at some or all of the nodes (in a few species from the base only) after the maturity of the primary panicles or sometimes before; branches often repeatedly branching, the short branchlets more or less fascicled and bearing usually much reduced leaves; the terminal one or two joints of the primary culm often finally falling, the whole producing an autumnal phase usually strikingly different from the vernal phase; secondary panicles reduced, the latest more or less included in the sheaths, the spikelets cleistogamous and perfecting their grains. The species of this subgenus are usually known as dichotomous panicums because they are related to *Panicum dichotomum*.

Key to the species of subgenus 2 irrespective of the groups

- 1a. Spikelets glabrous.
 - 2a. Spikelets 3 mm. long or more, strongly nerved.
 - Spikelets pointed; blades elongate..... 5. *P. DEPAUPERATUM*.
 - Spikelets blunt; blades not elongate.
 - Spikelets 3.2 to 3.3 mm. long; blades firm; sheaths, or some of them, hispid.
 95. *P. SCRIBNERIANUM*.
 - Spikelets not more than 3 mm. long; blades rather thin; sheaths glabrous or sparsely hispid..... 94. *P. HELLERI*.
 - 2b. Spikelets less than 3 mm. long.
 - 3a. Second glume and sterile lemma exceeding the fruit and pointed beyond it. Spikelets 2.2 to 2.9 mm. long.
 - Blades clustered toward the base..... 26. *P. NUDICAULE*.
 - Blades not clustered toward the base.
 - Sheaths, at least the secondary, hispid..... 106. *P. SCABRIUSCULUM*.
 - Sheaths glabrous.
 - Blades firm; fruit 1.5 mm. long..... 107. *P. CRYPTANTHUM*.
 - Blades thin; fruit nearly 2 mm. long..... 35. *P. YADKINENSE*.
 - 3b. Second glume and sterile lemma not pointed beyond the fruit.
 - 4a. Ligule manifest, 1 to 3 mm. long.
 - Culms rather stout; ligule 2 to 3 mm. long; sheaths glabrous..... 40. *P. SPRETUM*.
 - Culms slender; ligule 1 mm. long; sheaths sparsely pilose..... 83. *P. CURTIFOLIUM*.
 - 4b. Ligule obsolete.
 - 5a. Spikelets 1.5 mm. or less long.
 - Nodes bearded..... 27. *P. MICROCARPON*.
 - Nodes not bearded.
 - Culms and blades pilose..... 13. *P. STRIGOSUM*.
 - Culms glabrous.
 - Blades conspicuously ciliate; plants branching at base only.
 12. *P. POLYCAULON*.
 - Blades not ciliate; plants branching from middle or upper nodes.
 - Vernal culms 50 cm. tall or more; spikelets turgid, strongly nerved; autumnal phase erect, with fascicled branches shorter than the primary internodes..... 37. *P. CAERULESCENS*.
 - Vernal culms usually much less than 50 cm. tall; autumnal phase spreading or reclining.
 - Spikelets 1.1 to 1.2 mm. long; blades rarely as much as 5 cm. long.
 84. *P. CHAMAEOLONCHE*.
 - Spikelets 1.2 to 1.4 mm. long.
 - Blades elongate, at least some of them 8 to 10 cm. long.
 85. *P. GLABRIFOLIUM*.
 - Blades not more than 3 cm. long..... 81. *P. ENSIFOLIUM*.
 - 5b. Spikelets 2 mm. long or more.
 - Blades elongate, some of them 20 times as long as wide; spikelets 2.2 to 2.8 mm. long.

Blades erect; branches, when present, from the lower nodes only.

8. *P. WERNERI*.

Blades spreading; branches from upper nodes..... 24. *P. BICKNELLII*.

Blades not elongate, about 10 times as long as wide.

Culms soon prostrate, vinelike; branches divaricate.

Plants bright green; culms lax; spikelets not more than 2.1 mm. long.

38. *P. LUCIDUM*.

Plants grayish green; culms stiff; spikelets 2.5 mm. long.

39. *P. SPHAGNICOLA*.

Culms not vinelike; branches not divaricate.

Spikelets 2.3 to 2.6 mm. long.

Blades, or some of them, at least 8 mm. wide; fruit papillose-roughened.

90. *P. WEBBERIANUM*.

Blades not more than 6 mm. wide; fruit smooth and shining.

91. *P. PATENTIFOLIUM*.

Spikelets 2 mm. long.

Culms wiry, crisp-puberulent; blades ciliate at base.

88. *P. LANCEARIUM*.

Culms glabrous; blades not ciliate.

Blades erect, firm; spikelets turgid, strongly nerved; plants grayish olive..... 36. *P. ROANOKENSE*.

Blades spreading; spikelets not turgid.

Autumnal phase branched like a little tree; nodes glabrous or some sparsely pilose..... 33. *P. DICHOTOMUM*.

Autumnal phase topheavy-reclining; nodes, at least the lower, bearded, rarely glabrous..... 34. *P. BARBULATUM*.

1b. Spikelets pubescent.

6a. Spikelets 3 mm. or more long.

7a. Blades elongate, those of the midculm at least 15 times as long as wide.

Secondary panicles from basal sheaths only.

Spikelets pointed, about 3.5 mm. long..... 5. *P. DEPAUPERATUM*.

Spikelets blunt, about 3 to 3.2 mm. long..... 6. *P. PERLONGUM*.

Secondary panicles from upper branches.

Spikelets attenuate at base, pustulose-pubescent; lowermost sheaths softly villous.

20. *P. FUSIFORME*.

Spikelets not attenuate at base, not pustulose; lowermost sheaths glabrous or hispid.

Upper leaves approximate, sheaths glabrous..... 112. *P. EQUILATERALE*.

Upper leaves distant; at least the lower sheaths hispid..... 103. *P. ACULEATUM*.

7b. Blades not elongate, usually less than 10 times as long as wide.

8a. Blades velvety-pubescent beneath.

Spikelets 3 mm. long; plants velvety-villous throughout.

93. *P. MALACOPHYLLUM*.

Spikelets 4 mm. long or more.

Sheaths ascending-hirsute; ligule 3 to 4 mm. long..... 97. *P. RAVENELII*.

Sheaths downy-pubescent; ligule obsolete..... 115. *P. BOSCHII* var. *MOLLE*.

8b. Blades not velvety-pubescent beneath.

9a. Sheaths glabrous or minutely puberulent only.

Nodes bearded; spikelets 4 mm. long or more..... 115. *P. BOSCHII*.

Nodes not bearded; spikelets not more than 3.8 mm. long.

Spikelets 3.5 to 3.8 mm. long; blades 2 cm. wide or more.

114. *P. LATIFOLIUM*.

Spikelets scarcely more than 3 mm. long.

Spikelets turgid, blunt; blades mostly less than 1 cm. wide.

94. *P. HELLERI*.

Spikelets not turgid; blades more than 1 cm. wide.

Panicle narrow, the branches ascending; spikelets on long stiff pedicels.

25. *P. CALLIPHYLLUM*.

Panicle as broad as long, the branches spreading.

Plants glaucous; basal blades conspicuously ciliate.

110. *P. MUTABILE*.

Plants not glaucous; basal blades not ciliate, or at the base only.

Culms erect, or autumnal phase leaning; blades symmetrical, broadly cordate..... 109. *P. COMMUTATUM*.

Culms decumbent; blades usually unsymmetrical and falcate, narrow to the scarcely cordate base..... 111. *P. JOORII*.

9b. Sheaths pubescent.

Pubescence ascending or appressed.

Spikelets 3 to 3.2 mm. long; first glume conspicuously remote.

65. *P. MALACON.*Spikelets 3.5 to 4 mm. long; first glume not remote.... 96. *P. OLIGOSANTHES.*

Pubescence spreading, sometimes sparse.

Plants robust, about 1 m. tall; blades usually 2 cm. or more wide.

113. *P. CLANDESTINUM.*

Plants rarely more than 50 cm. tall; blades rarely more than 1.5 cm. wide.

Panicle about as wide as long; blades ascending or spreading.

Spikelets attenuate at base, 3.5 to 4 mm. long.... See 14. *PEDICELLATA.*

Spikelets not attenuate at base, not more than 3.3 mm. long.

Spikelets 3.2 to 3.3 mm. long; blades firm; sheaths, or some of them, more or less hispid..... 95. *P. SCRIBNERIANUM.*Spikelets not more than 3 mm. long; blades rather thin; sheaths, or some of them, glabrous or sparsely hispid..... 94. *P. HELLERI.*Panicle narrow, the branches erect (sometimes ascending in *P. wilcoxianum*), or spreading at anthesis only; blades erect.

Spikelets not more than 3 mm. long; blades not more than 6 mm. wide.

92. *P. WILCOXIANUM.*

Spikelets 3.7 to 4 mm. long; blades 8 to 20 mm. wide.

Blades papillose-hispid..... 98. *P. LEIBERGHII.*Blades glabrous on both surfaces..... 99. *P. XANTHOPHYSUM.*

6b. Spikelets less than 3 mm. long.

10a. Blades elongate, not more than 5 mm. wide; secondary panicles at the base only or wanting.

Culms single or few in a tuft; spikelets turgid, 2.7 to 3 mm. long.

6. *P. PERLONGUM.*

Culms in large tufts; spikelets not turgid, not more than 2.7 mm. long.

Sheaths pilose..... 7. *P. LINEARIFOLIUM.*Sheaths glabrous..... 8. *P. WERNERI.*

10b. Blades usually not elongate; secondary panicles not at the base.

11a. Spikelets attenuate at base, mostly prominently pustulose. Blades narrow, stiff, strongly nerved, tapering from base to apex.

Nodes bearded; plants grayish-villous; autumnal blades flat.

Spikelets 2 mm. long..... 16. *P. CHRYSOPSIDIFOLIUM.*Spikelets 2.5 to 2.8 mm. long..... 17. *P. CONSANGUINEUM.*

Nodes not bearded; plants villous only at the base, or nearly glabrous.

Autumnal blades flat.

Spikelets 2 mm. long; panicle branches loosely ascending.

15. *P. BENNETTENSE.*

Spikelets 2.5 to 2.8 mm. long; panicle branches widely spreading at anthesis.

18. *P. ANGUSTIFOLIUM.*

Autumnal blades involute; lower panicle branches more or less ascending.

Spikelets pointed beyond the fruit, fusiform..... 19. *P. PINETORUM.*

Spikelets blunt, obovate.

Plants glabrous or nearly so.

Spikelets subsecund along the suberect panicle branches.

23. *P. NEURANTHUM.*Spikelets not subsecund; panicle loose and open..... 22. *P. OVINUM.*

Plants pubescent, at least on the lower half.

Spikelets about 2.4 mm. long; vernal blades 7 to 12 cm. long; autumnal blades not falcate..... 21. *P. ARENICOLOIDES.*Spikelets not more than 2 mm. long; vernal blades 4 to 6 cm. long; autumnal blades falcate..... 14. *P. ACICULARE.*

11b. Spikelets not attenuate at base.

12a. Sheaths retrorsely pilose. Blades soft and lax.

Blades ciliate and more or less pilose on the surface; spikelets 2 mm. long.

10. *P. XALAPENSE.*

Blades glabrous or nearly so on the surface and margin; spikelets 2.2 mm. long.

9. *P. LAXIFLORUM.*

12b. Sheaths not retrorsely pilose.

13a. Ligule manifest, mostly 2 to 5 mm. long, at least 1 mm. long.

Sheaths, or all but the lowest, glabrous; spikelets not more than 1.6 mm. long.

Panicle narrow, one-fourth to one-third as wide as long.... 40. *P. SPRETUM.*

Panicle open, nearly as wide as long.

- Spikelets 1.5 mm. long..... 41. *P. LINDHEIMERI*.
 Spikelets 1.1 mm. long..... 43. *P. LONGILIGULATUM*.
 Sheaths pubescent.
 Ligule 1 mm. long; sheaths sparsely pilose; spikelets 1.4 mm. long.
 83. *P. CURTIFOLIUM*.
 Ligule usually more than 1 mm. long.
 Ligule 1 to 1.5 mm. long. Culms and sheaths appressed-pubescent;
 spikelets 1.5 mm. long or more.
 Spikelets 2.8 to 2.9 mm. long..... 66. *P. DEAMII*.
 Spikelets less than 2 mm. long.
 Spikelets 1.8 to 1.9 mm. long; plants bluish green.
 70. *P. TSUGETORUM*.
 Spikelets 1.5 mm. long, nearly globular; plants olivaceous.
 72. *P. ORICOLA*.
 Ligule 2 to 5 mm. long.
 Spikelets 1 to 1.3 mm. long; culms and sheaths softly appressed-pubescent.
 Spikelets 1.2 to 1.3 mm. long..... 42. *P. LEUCOTHRIX*.
 Spikelets not more than 1 mm. long..... 44. *P. WRIGHTIANUM*.
 Spikelets mostly more than 1.5 mm. long, if less, pubescence spreading.
 See 8. *LANUGINOSA*.
 13b. Ligule obsolete or less than 1 mm. long.
 14a. Nodes bearded (*P. scoparium* may appear to be bearded).
 Spikelets nearly 3 mm. long; plants velvety-villous throughout.
 93. *P. MALACOPHYLLUM*.
 Spikelets rarely as much as 2.5 mm. long; plants not pubescent throughout.
 Spikelets 1.5 to 1.6 mm. long..... 27. *P. MICROCARPON*.
 Spikelets 2 mm. long or more (sometimes 1.8 mm. in *P. mundum*).
 Blades all velvety; autumnal phase usually sparingly branching.
 29. *P. ANNULUM*.
 Blades glabrous, or only the lower pubescent or velvety.
 Autumnal phase profusely branching, the branchlets forming large
 clusters at the nodes of the primary culms. Upper sheaths usu-
 ally glandular spotted..... 28. *P. NITIDUM*.
 Autumnal phase sparingly branching.
 Lower sheaths or blades velvety-pilose.
 Sheaths and upper nodes glabrous..... 31. *P. CLUTEI*.
 Lower sheaths and all the nodes pubescent.
 30. *P. MATTAMUSKEETENSE*.
 Lower sheaths ascending-pilose or glabrate, not velvety, the blades
 glabrous or papillose-ciliate toward the base.
 105. *P. MUNDUM*.
 14b. Nodes not bearded.
 15a. Plants densely gray-velvety throughout, a viscid, glabrous ring below
 the nodes..... 102. *P. SCOPARIUM*.
 15b. Plants not gray-velvety.
 16a. Sheaths or some of them pilose or hispid.
 Pubescence papillose-hispid, papillose-pilose, or sometimes glabrate.
 Spikelets glabrous, ovate, pointed beyond the fruit, the first glume
 short, broadly acute..... 106. *P. SCABRIUSCULUM*.
 Spikelets pubescent or pilose, obovate or elliptic, the first glume
 longer, acute.
 Blades about 2 cm. wide, often as much as 3 cm.; fruit distinctly
 shorter than the spikelet..... 113. *P. CLANDESTINUM*.
 Blades less than 15 mm. wide; fruit nearly as long as the spikelet.
 Blades flat, 8 to 15 mm. wide..... 104. *P. RECOGNITUM*.
 Blades involute-acuminate, not more than 6 mm. wide.
 92. *P. WILCOXIANUM*.
 Pubescence ascending-pilose.
 Spikelets 2.8 to 2.9 mm. long..... 66. *P. DEAMII*.
 Spikelets not more than 2.5 mm. long.
 Spikelets 2 to 2.5 mm. long.
 Winter blades elongate, 5 to 10 cm. long; plants bluish green;
 spikelets 2 mm. long..... 69. *P. WILMINGTONENSE*.
 Winter blades 1 to 3 cm. long; plants olivaceous.
 Spikelets about 2.4 mm. long; panicle open, branches stiffly
 spreading..... 67. *P. COMMONSIANUM*.

Spikelets 2 to 2.1 mm. long; panicle rather dense, branches ascending..... 68. *P. ADDISONII*.

Spikelets not more than 1.7 mm. long.

Blades white-margined; spikelets 1.6 to 1.7 mm. long, elliptic. 76. *P. TENUE*.

Blades not white-margined; spikelets 1.3 to 1.4 mm. long, nearly globular..... 71. *P. COLUMBIANUM* var. *THINUM*.

16b. Sheaths glabrous or puberulent only.

17a. Spikelets spherical, not more than 1.8 mm. long. Blades cordate, ciliate at base..... See 10. *SPHAEROCARPA*.

17b. Spikelets not spherical.

18a. Culms soon prostrate, vinelike; branches divaricate.

Plants bright green; culms lax; spikelets not more than 2.1 mm. long..... 38. *P. LUCIDUM*.

Plants grayish green; culms stiff; spikelets 2.5 mm. long. 39. *P. SPHAGNICOLA*.

18b. Culms not vinelike; branches not divaricate.

19a. Spikelets asymmetrically pyriform, strongly nerved; culms wiry..... See 12. *LANCEARIA*.

19b. Spikelets not pyriform.

20a. Blades elongate, especially the upper, about 20 times as long as wide. Spikelets about 2.5 mm. long, on long pedicels. 24. *P. BICKNELII*.

20b. Blades not elongate. (See continuation.)

(Continuation.)

21a. Spikelets 2 mm. long or more.

Spikelets 2.5 to 3 mm. long; blades cordate, usually 1 cm. or more wide.

Plants glaucous; basal blades conspicuously ciliate..... 110. *P. MUTABILE*.

Plants not glaucous; basal blades ciliate at base only.

Culms crisp-puberulent; blades rarely more than 1 cm. wide; spikelets about 2.5 mm. long..... 103. *P. ASHEI*.

Culms glabrous or obscurely puberulent; blades usually 1.5 cm. wide or more; spikelets 2.7 to 3 mm. long..... 109. *P. COMMUTATUM*.

Spikelets not more than 2.3 mm. long; blades not cordate, usually less than 1 cm. wide.

Blades conspicuously ciliate, soft, lax, crowded at the base..... 11. *P. CILIATUM*.

Blades not ciliate or at base only, not crowded at the base.

Blades not more than 6 mm. wide; plants not branching or rarely branching from near the base..... 8. *P. WERNERI*.

Blades 7 mm. wide or more; plants branching from middle and upper nodes.

Primary blades spreading; panicle purplish; fruit exposed at summit.

31. *P. CLUTEI*.

Primary blades erect; panicle green; fruit covered..... 32. *P. BOREALE*.

21b. Spikelets not more than 1.7 mm. long.

Culms crisp-puberulent; spikelets turgid..... 71. *P. COLUMBIANUM*.

Culms glabrous.

Blades white-margined, firm.

Blades puberulent beneath, often above..... 76. *P. TENUE*.

Blades glabrous.

Uppermost blades much reduced; culms branching from lower nodes only, the branches repeatedly branching..... 77. *P. ALBOMARGINATUM*.

Uppermost blades about as long as the others; culms bearing short branches from middle and upper nodes..... 78. *P. TRIFOLIUM*.

Blades not white-margined or very obscurely so (or if white margin is evident, spikelets only 1.1 mm. long).

Culms branching only at base; plants soft, light green..... 82. *P. VERNALE*.

Culms branching at the nodes.

Spikelets 1.1 mm. long; winter blades bluish green, not glossy.

80. *P. CONCINNUS*.

Spikelets 1.3 to 1.5 mm. long.

Blades involute, falcate, with long stiff hairs on margin near base; plants stiff and wiry..... 86. *P. BREVE*.

Blades not involute or at tip only, not falcate.

Plants bright green; winter blades conspicuous, glossy green.

79. *P. FLAVOVIRENS*.

Plants olive; winter blades not conspicuous nor glossy.... 81. *P. ENSIFOLIUM*.

1. *Depauperáta*.—Ligule less than 1 mm. long; blades elongate, the basal ones not forming a distinct rosette in autumn; spikelets strongly 7- to 9-nerved. Autumnal phase with short branches from lower nodes.

5. *Panicum depauperátum* Muhl. (Fig. 914.) Vernal phase with culms several to many in a tuft, slender but rather stiff, erect or nearly so; sheaths glabrous or papillose-pilose; blades 6 to 15 cm. long, 2 to 5 mm. wide, often involute in drying; panicle exserted, usually not much exceeding the leaves, 4 to 8 cm. long, few-flowered; spikelets 3.2 to 3.8 mm. long, elliptic, pointed, glabrous or sparsely pubescent; second glume and sterile lemma extending beyond the fruit, forming a beak. Autumnal phase similar, the reduced panicles partly concealed in the basal leaves. ♀ —Open sterile woods, Quebec and Nova Scotia to Minnesota, south to Georgia and Texas.

6. *Panicum perlongum* Nash. (Fig. 915.) Vernal phase similar to that of *P. depauperatum*; the tufts smaller, usually pilose, the panicle narrower; spikelets 2.7 to 3.2 mm. long, oval, blunt, sparingly pilose, the glume and sterile lemma not extending beyond the fruit. Autumnal phase similar, the reduced panicles numerous. ♀ —Prairies and dry soil, Indiana to Manitoba and North Dakota, south to Colorado and Texas.

7. *Panicum linearifólium* Scribn. (Fig. 916.) Vernal phase in dense tufts; culms slender, erect, 20 to 45 cm. tall; sheaths papillose-pilose; blades erect, usually overtopping the panicles, 2 to 4 mm. wide; panicle long-exserted, 5 to 10 cm. long, the flexuous branches ascending; spikelets 2.2 to 2.7 mm. long, oblong-elliptic, obtuse, sparsely pilose. Autumnal phase similar, the reduced panicles hidden among the basal leaves. ♀ —Dry woods, Quebec and Maine to Wisconsin, south to Georgia and Texas.

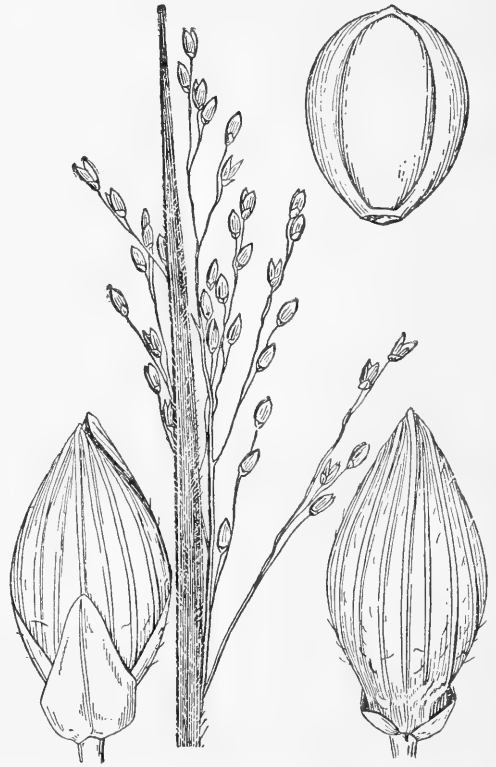


FIGURE 914.—*Panicum depauperatum*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Amer. Gr. Natl. Herb. 78, D. C.)

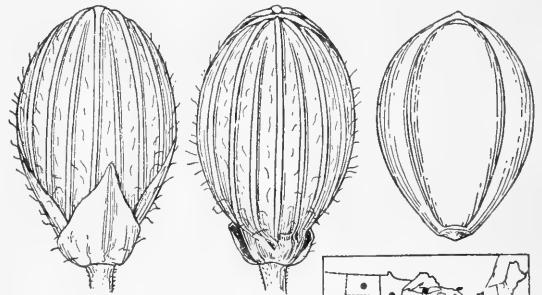
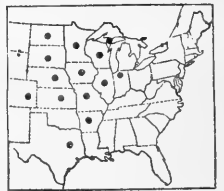


FIGURE 915.—*Panicum perlongum*. Two views of spikelet, and floret, $\times 10$. (Type.)



8. *Panicum wernéri* Scribn. (Fig. 917.) Vernal phase similar to that of *P. linearifolium*, the culms usually stiffer, blades firmer, shorter and wider (15 cm. long or less); nodes

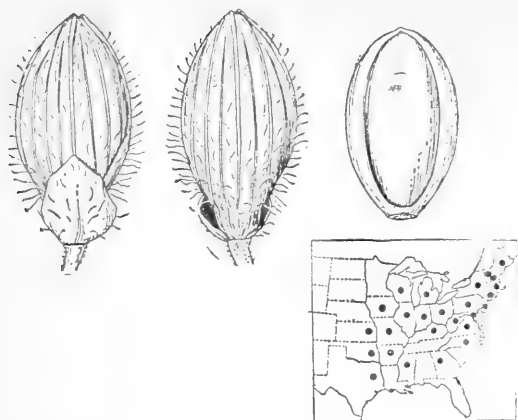


FIGURE 916.—*Panicum linearifolium*. Two views of spikelet, and floret, $\times 10$. (Type.)

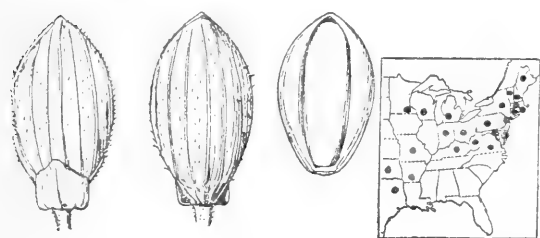


FIGURE 917.—*Panicum wernerii*. Two views of spikelet, and floret, $\times 10$. (Type.)

usually sparingly pilose; sheaths glabrous; spikelets 2.1 to 2.4 mm. long, nearly or quite glabrous. Autumnal phase similar to the vernal, sometimes late in the season bearing simple branches from the lower nodes. ♀ —Sterile woods and knolls, Quebec and Maine to Minnesota, Tennessee, Virginia, Kentucky, and Texas. Intergrades with *P. linearifolium*.

2. Laxiflora.—Tufted, erect to spreading; foliage aggregate toward base, light green, soft, the basal blades not in distinct rosettes in autumn; ligule nearly obsolete; primary panicles long-exserted; spikelets obovate, obtuse, turgid, 5- to 7-nerved. Autumnal phase branching near base, forming close flat tuft, with reduced panicles.

9. *Panicum laxiflorum* Lam. (Fig. 918.) Vernal culms 20 to 60 cm. tall, erect or geniculate below; nodes bearded with reflexed hairs; sheaths retrorsely pilose; blades 10 to 20 cm. long, 7 to 12 mm. wide, glabrous or sparsely ciliate; panicle 8

to 12 cm. long, lax, few-flowered, the lower branches often reflexed; spikelets 2.2 to 2.3 mm. long, papillose-pilose. Autumnal blades scarcely reduced, much exceeding the secondary panicles. ♀ —Rich or damp woods, Virginia to Florida and Alabama.

10. *Panicum xalapense* H. B. K. (Fig. 919.) Vernal culms and blades on the average shorter than in *P. laxiflorum*, the blades pilose on one or both surfaces or nearly glabrous, usually short-ciliate; spikelets 1.9 to 2 mm. long, pilose. Autumnal phase with usually denser tufts and shorter blades. ♀ —Woods, Maryland to Illinois and Missouri, south to Florida and Texas; Mexico; Guatemala; Dominican Republic. Originally described from Xalapa (Jalapa), Mexico. *PANICUM XALAPENSE* var. *STRICTIRAMEUM* Hitchc. and Chase. Vernal

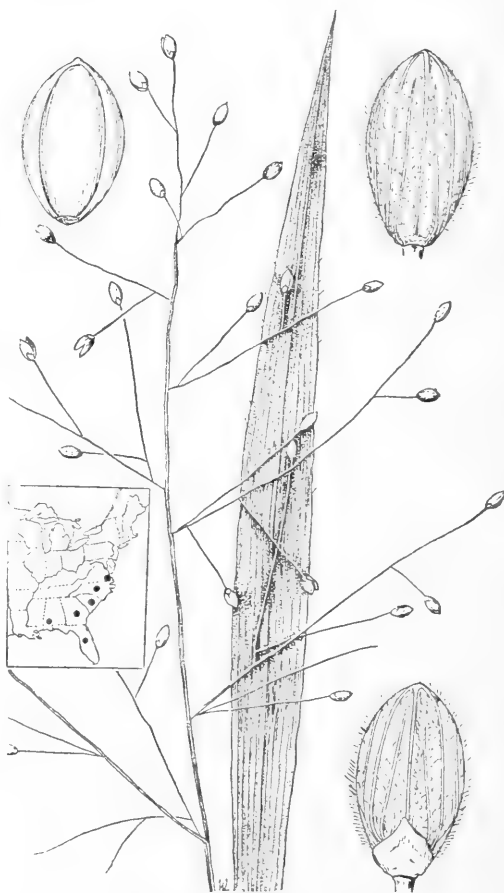


FIGURE 918.—*Panicum laxiflorum*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Curtiss 6635, Fla.)

panicles more compact, branches ascending, spikelets 1.7 mm. long; blades shorter, narrower. 2 — Dry woods, Coastal Plain, South Carolina to Texas; Tennessee.

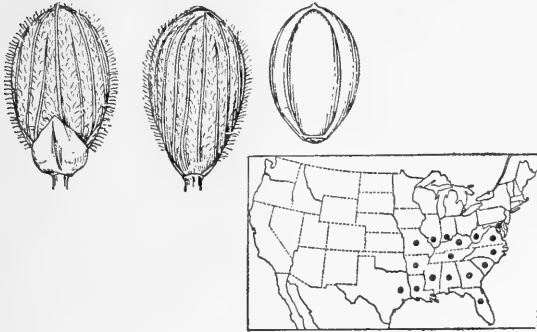


FIGURE 919.—*Panicum xalapense*. Two views of spikelet, and floret, $\times 10$. (Type.)

11. *Panicum ciliatum* Ell. (Fig. 920.) Vernal culms 5 to 30 cm. tall; sheaths ciliate on the margin; blades 3 to 6 cm. long, 3 to 8 mm. wide, the uppermost often much smaller, ciliate with stiff hairs 2 to 3 mm. long; panicle 3 to 4 cm. long, the axis pilose, branches spreading; spikelets 1.8 to 2 mm. long, pilose. Autumnal mats with slightly smaller blades. 2 — Low pinelands and hammocks, Coastal Plain, North Carolina to Florida and Texas; Mexico.

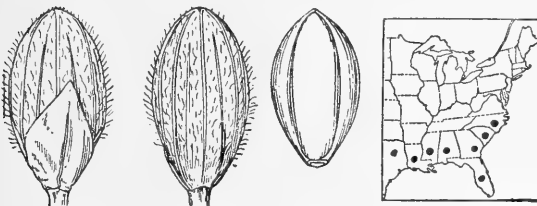


FIGURE 920.—*Panicum ciliatum*. Two views of spikelet, and floret, $\times 10$. (Type.)

12. *Panicum polycaulon* Nash. (Fig. 921.) Vernal culms 10 to 20 cm. tall; blades mostly narrower than in *P. ciliatum*, panicle similar; spikelets 1.5 to 1.6 mm. long (rarely as much as 2 mm.), glabrous. Autumnal mats very dense. 2 — Low pine woods, Coastal Plain, Georgia, Florida, Alabama, and Mississippi; West Indies; British Honduras.

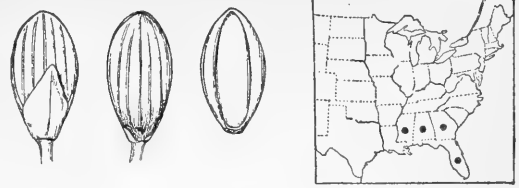


FIGURE 921.—*Panicum polycaulon*. Two views of spikelet, and floret, $\times 10$. (Type.)

13. *Panicum strigosum* Muhl. (Fig. 922.) Vernal culms 15 to 30 cm. tall, the culms and sheaths sparsely pilose; nodes bearded; blades mostly 5 to 7 mm. wide, pilose on both surfaces, stiffly ciliate; panicle 4 to 6 cm. long, axis and branches pilose; spikelets 1.3 to 1.5 mm. long, glabrous. Autumnal phase a dense mat. 2 — Sandy woods, Virginia and Tennessee to Florida and Texas; Mexico and Cuba to Colombia.

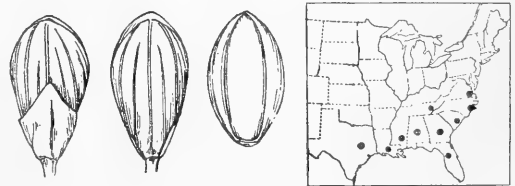


FIGURE 922.—*Panicum strigosum*. Two views of spikelet, and floret, $\times 10$. (Type.)

3. *Angustifolia*.—Densely tufted, grayish green; ligules not more than 1 mm. long; blades narrow, usually stiff, with prominent nerves, sometimes longitudinally wrinkled, often ciliate at base; spikelets attenuate at base, rather strongly 7-nerved, papillose-pubescent; first glume narrow and sheathing at base. Autumnal culms repeatedly branching, forming bushy crowns; blades greatly reduced.

14. *Panicum aciculare* Desv. ex Poir. (Fig. 923.) Vernal culms ascending from a spreading base, 20 to 50 cm. tall, appressed-pubescent below; lower sheaths villous; blades spreading or ascending, narrowed to an involute point, glabrous or the lower sparsely pilose, the middle culm blades 4 to 6 cm. long, 2 to 5



FIGURE 923.—*Panicum aciculare*. Plant, $\times 1$; two views of spikelet, and floret, $\times 10$. (Vernal phase, Chase 7148, N. C.; autumnal phase, Hitchcock 317, N. C.)

mm. wide; panicle 3 to 7 cm. long, the flexuous branches spreading at maturity; spikelets 1.9 to 2 mm. long, obovate. Autumnal phase bushy branching, the culms 10 to 30 cm. long, spreading, forming dense cushions, the blades involute, sharp-pointed, usually arcuate, mostly 1 to 3 cm. long. ♀ —Sandy pine woods Coastal Plain, New Jersey; Virginia to northern Florida, Arkansas, Oklahoma, and Texas; West Indies, northern South America.

ascending, 8 to 15 cm. long (the lower shorter), 4 to 7 mm. wide, acuminate; panicle short-exserted, 5 to 7 cm. long, the flexuous branches loosely ascending; spikelets 2 mm. long, obovate-ellipsoid, papillose-villous. Autumnal phase stiffly ascending, sparingly branching at the middle and upper nodes, the branches and numerous flat reduced blades narrowly ascending, the blades mostly 4 to 5 cm. long. ♀ —Known only from dry sandy savannalike park

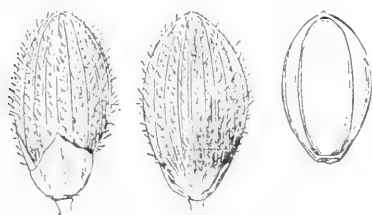


FIGURE 924.—*Panicum bennettense*. Two views of spikelet, and floret, $\times 10$. (Duplicate type.)

15. *Panicum bennettense* M. V. Brown. (Fig. 924.) Vernal culms erect, 30 to 70 cm. tall, obscurely appressed-puberulent; lower sheaths sparsely papillose-pubescent; blades

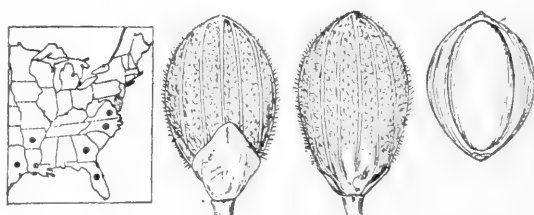


FIGURE 925.—*Panicum chrysopsidifolium*. Two views of spikelet, and floret, $\times 10$. (Type.)

surrounding Bennett Civil War Memorial, near Durham, N. C.

16. *Panicum chrysopsidifolium* Nash. (Fig. 925.) Vernal culms ascending or spreading, 30 to 45 cm.

tall, grayish-villous, especially below, the nodes bearded; sheaths villous; blades 5 to 10 cm. long, 3 to 5 mm. wide, villous on both surfaces; panicle 4 to 6 cm. long; spikelets 2 mm. long, obovate, villous. Autumnal phase spreading, forming mats; blades flat, becoming papery with age. 2 — Sandy pine woods, Coastal Plain, Virginia to Florida, Arkansas and Texas; West Indies.

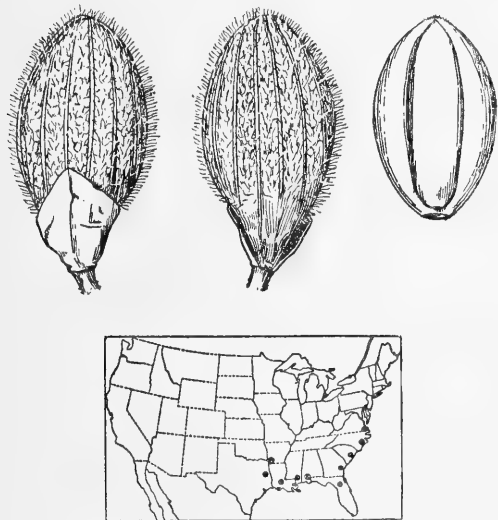


FIGURE 926.—*Panicum consanguineum*. Two views of spikelet, and floret, $\times 10$. (Type.)

17. *Panicum consanguineum* Kunth. (Fig. 926.) Vernal culms ascending or spreading, 20 to 50 cm. tall, densely felty-villous below, the nodes bearded; sheaths villous, especially the lower; blades 7 to 11 cm. long, 5 to 8 mm. wide, villous, or nearly glabrous above; panicle 4 to 8 cm. long, the lower branches narrowly ascending; spikelets 2.6 to 2.8 mm. long, obovate, papillose-villous. Autumnal phase spreading or decumbent, the numerous branches somewhat flabellately fascicled, the blades 3 to 4 cm. long, 2 to 3 mm. wide, flat, thin, papery. 2 — Sandy pine woods, Coastal Plain, Virginia to northern Florida, west to Arkansas and Texas.

18. *Panicum angustifolium* Ell. 927.) Vernal culms erect or nearly so, 30 to 50 cm. tall, the lowermost internodes gray crisp-villous; lower sheaths

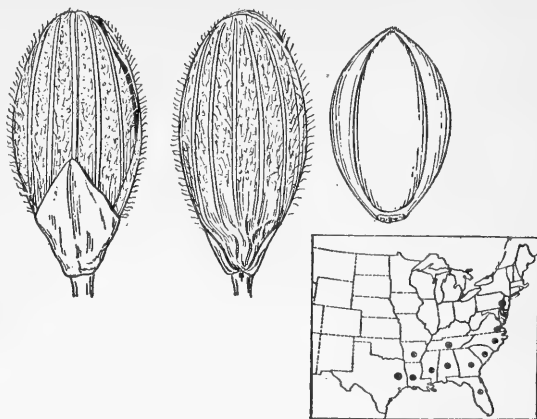


FIGURE 927.—*Panicum angustifolium*. Two views of spikelet, and floret, $\times 10$. (Type.)

appressed-villous, the upper glabrous; blades stiffly ascending, 8 to 15 cm. long, 4 to 8 mm. wide, long-acuminate; panicle long-exserted, 4 to 10 cm. long, loosely flowered, the branches widely spreading at anthesis, the lower often reflexed; spikelets 2.5 to 2.8 mm. long, elliptic-obovate, papillose-villous. Autumnal phase ascending or somewhat top-heavy-reclining, not spreading or mat-like; blades very numerous, flat, appressed, rather thin and papery. 2 — Sandy pine woods, Coastal Plain, New Jersey to northern Florida and Texas; Tennessee (Knoxville), Arkansas; Nicaragua.



FIGURE 928.—*Panicum pinetorum*. Two views of spikelet, and floret, $\times 10$. (Type.)

19. *Panicum pinetorum* Swallen. (Fig. 928.) Vernal culms slender, wiry, 55 to 90 cm. tall; sheaths glabrous or the lowermost appressed-pilose; blades 6 to 9 cm. long, 2 to 3 mm. wide, involute in drying, glabrous; panicle 7 to 9 cm. long, narrow, the branches not more than 3 cm. long, ascending; spikelets 2.3 to

2.5 mm. long, (or before maturity to 3 mm. long), commonly somewhat twisted, pointed beyond the fruit, minutely pubescent; fruit 1.6 to 1.7 mm. long. Autumnal phase erect or top-heavy reclining, freely branching, the slender involute blades scarcely reduced; panicles reduced, few-flowered, obscured by the foliage. ♀ —Known only from open pine woods near Bonita Springs, Lee County, Fla.

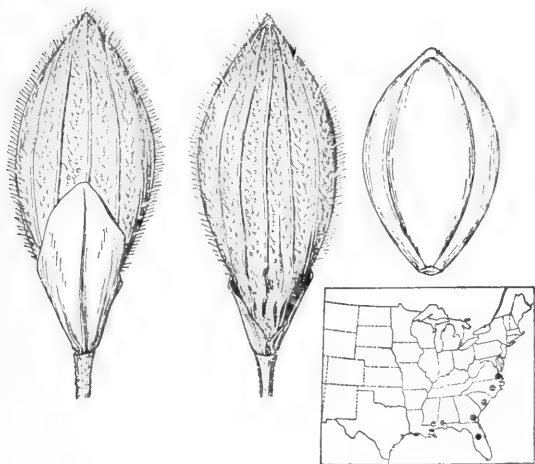


FIGURE 929.—*Panicum fusiforme*. Two views of spikelet, and floret, $\times 10$. (Type.)

20. *Panicum fusiforme* Hitchc. (Fig. 929.) Vernal culms erect, 30 to 70 cm. tall, the basal and lower sheaths and lower surface of blades softly pubescent; panicle loose, the lower branches spreading or drooping; spikelets 3.3 to 3.5 mm. long, elliptic, acutish or beaked beyond the fruit, long-attenuate at base, papillose-villous. Autumnal phase bushy, the blades soon involute, 3 to 5 cm. long. ♀ —Sandy pine woods, Virginia to Florida and Mississippi; West Indies; British Honduras.

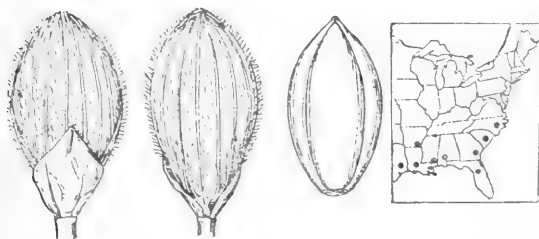


FIGURE 930.—*Panicum arenicolides*. Two views of spikelet, and floret, $\times 10$. (Type.)

21. *Panicum arenicolides* Ashe. (Fig. 930.) Vernal phase intermediate between that of *P. angustifolium* and *P. aciculare*; culms 30 to 50 cm. tall; lower sheaths and blades softly villous; blades 7 to 12 cm. long, 3 to 4 mm. wide, apex subinvolute; panicle 4 to 6 cm. long, the lower branches ascending; spikelets 2.1 to 2.5 mm. long, obovate, papillose-pilose. Autumnal phase bushy-branching, erect or top-heavy, the blades involute. ♀ —Sandy pine woods, Coastal Plain, North Carolina to Florida, Arkansas, and Texas; Cuba; Guatemala; northern South America.

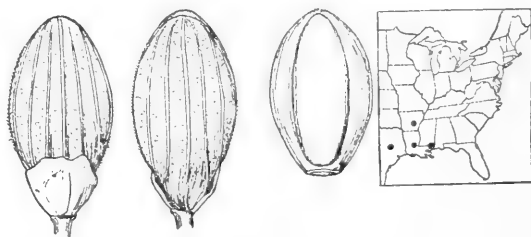


FIGURE 931.—*Panicum ovinum*. Two views of spikelet, and floret, $\times 10$. (Type.)

22. *Panicum ovinum* Scribn. and Smith. (Fig. 931.) Vernal culms erect or nearly so, not densely tufted, glabrous, 30 to 50 cm. tall; sheaths glabrous or the lowermost appressed-pubescent; blades erect or ascending, 10 to 15 cm. long, 3 to 6 mm. wide, glabrous; panicle 5 to 9 cm. long, the lower branches ascending; spikelets 2.1 to 2.2 mm. long, papillose-pubescent, sometimes minutely so. Autumnal phase erect or nearly so, the blades loosely involute. ♀ —Dry or moist open ground, Mississippi to Arkansas and eastern Texas; Mexico.



FIGURE 932.—*Panicum neuranthum*. Two views of spikelet, and floret, $\times 10$. (Type.)

23. *Panicum neuranthum* Griseb. (Fig. 932.) Vernal phase glabrous as

a whole; culms 30 to 60 cm. tall; blades erect or ascending, the short basal blades few or wanting; panicle 5 to 9 cm. long, narrow, the flexuous branches narrowly ascending, the branchlets appressed, the short-pedicelled spikelets more or less secund along the branches; spikelets 2 mm. long, finely papillose-pubescent. Autumnal culms erect, about as tall as the vernal phase; blades involute. 21 —Savannas and open ground, southern Florida; Mississippi (Horn Island); Texas; British Honduras; Cuba.

4. *Bicknelliana*.—In small tufts, erect or ascending; sheaths glabrous; ligules nearly obsolete; panicles few-flowered; spikelets long-pedi-

celed, 7-nerved. Autumnal culms sparingly branching from upper or middle nodes, the blades not much reduced. Intermediate in habit between *Depauperata* and *Dichotoma*.

24. *Panicum bicknellii* Nash. (Fig. 933.) Vernal phase bluish green; culms 30 to 50 cm. tall; nodes sparsely bearded or glabrous; blades stiffly ascending, 8 to 15 cm. long, 3 to 8 mm. wide, the uppermost usually the longest, narrowed toward the usually ciliate base; panicle 5 to 8 cm. long, the branches ascending; spikelets 2.3 to 2.8 mm. long, sparsely pubescent or rarely glabrous. Autumnal culms erect, forming a loose bushy tuft, the stiffly ascending blades not much reduced, overtopping the narrow few-flowered panicles. 21 —Dry sterile or rocky woods, Connecticut and Michigan to Georgia and Arkansas.



FIGURE 933.—*Panicum bicknellii*. Plant, $\times 1$; two views of spikelet, and floret, $\times 10$. (Porter, Pa.)

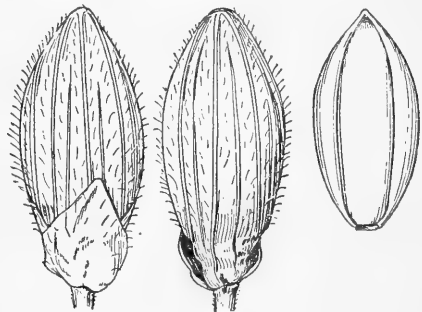


FIGURE 934.—*Panicum calliphyllum*. Two views of spikelet, and floret, $\times 10$. (Type.)

25. *Panicum calliphyllum* Ashe. (Fig. 934.) Vernal phase yellowish green; culms 35 to 50 cm. tall; nodes sparsely villous; blades ascending, 8 to 12 cm. long, 9 to 12 mm. wide, ciliate at the rounded base; panicle 7 to 9 cm. long, with a few ascending branches; spikelets mostly 3 mm. long, elliptic, sparsely pubescent. Autumnal culms sparingly branching from the middle nodes, the branches about as long as the internodes, erect. 21 —Woods, rare and local, Ontario, Massachusetts, New York, Ohio, Michigan, and Missouri.

5. *Nudicaulia*.—A single rare and local species.

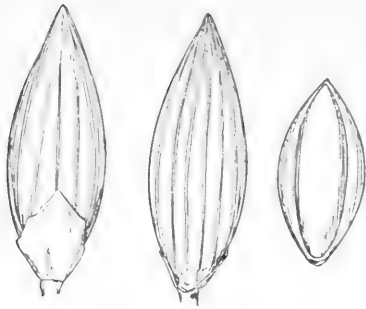


FIGURE 935.—*Panicum nudicaule*. Two views of spikelet, and floret, $\times 10$. (Type.)

26. *Panicum nudicaule* Vasey. (Fig. 935.) Vernal culms erect from a somewhat spreading base, 40 to 60 cm. tall, glabrous; sheaths glabrous; blades erect, rather thick, 4 to 10 cm. long, 5 to 8 mm. wide, the uppermost reduced, giving the culm a naked appearance; panicle long-exserted, 4 to 7 cm. long, few-flowered, the branches ascending; spikelets 2.7 to 2.9 mm. long, narrowly ovate, acuminate, glabrous. Autumnal phase unknown. ♀ —Swamps, rare, western Florida, southern Alabama, and Mississippi.

6. *Dichotoma*.—Culms few to many in a tuft, glabrous, or only the nodes pubescent; sheaths mostly glabrous or nearly so; ligules minute; panicles open; spikelets 5- to 7-nerved. Autumnal culms usually freely branching; leaves and panicles usually much reduced.

27. *Panicum microcarpon* Muhl. ex Ell. (Fig. 936.) Vernal culms tufted, erect or sometimes geniculate at base, 60 to 100 cm. tall, the nodes densely bearded with reflexed hairs; sheaths often mottled with white spots between the nerves; blades spreading, the upper often reflexed, 10 to 12 cm. long, 8 to 15 mm. wide, glabrous, sparsely papillose-ciliate at base; panicle many-flowered, 8 to 12 cm. long; spikelets 1.6 mm. long, elliptic, glabrous (rarely minutely pubescent). Autumnal phase much branched from all the nodes, reclining from the weight of the dense mass of branches; blades flat, mostly 2 to 4 cm. long. ♀ —Wet woods and swampy places, Massachusetts to Illinois, south to northern Florida and eastern Texas.

28. *Panicum nitidum* Lam. (Fig. 937.) Vernal culms tufted, erect, 30 to 60 cm. tall, the nodes bearded with reflexed hairs; upper sheaths often glandular-mottled; blades glabrous, 5 to 10 mm. wide, the upper usually reflexed; panicle ovoid, 5 to 8 cm. long, many-flowered; spikelets elliptic, 2 mm. long, pubescent. Autumnal

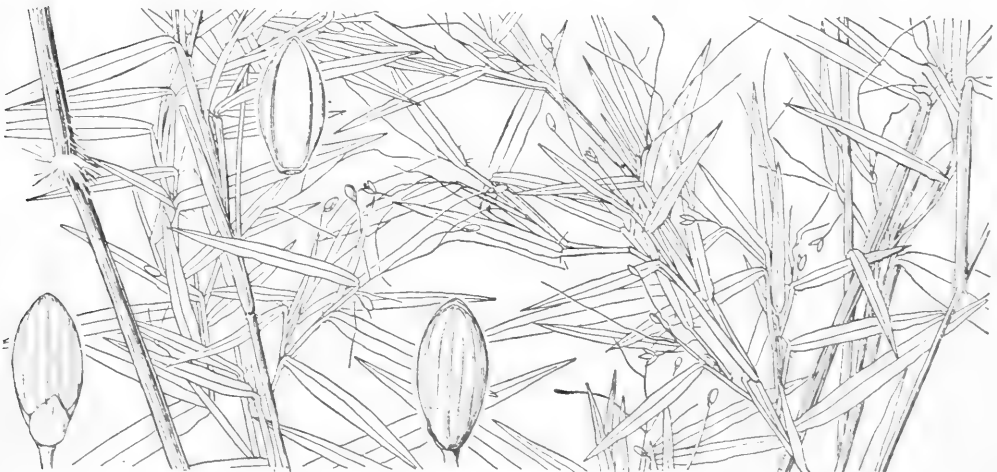


FIGURE 936.—*Panicum microcarpon*. Plant, $\times 1$; two views of spikelet, and floret, $\times 10$. (Maxon and Standley 86, Md.)

phase erect or reclining, the branchlets and foliage forming large clusters from the nodes of the primary culms. ♀ —Low moist or marshy ground, Coastal Plain, New Jersey; Virginia to Florida and Texas; Missouri (Carter County); Bahamas, Cuba.

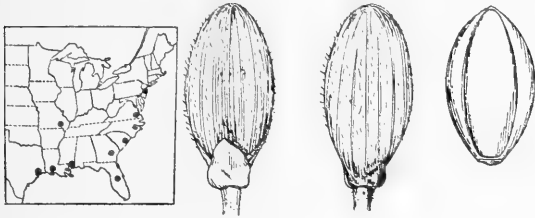


FIGURE 937.—*Panicum nitidum*. Two views of spikelet, and floret, $\times 10$. (Type.)

29. *Panicum ánnulum* Ashe. (Fig. 938.) Vernal phase usually purplish, in small tufts or solitary; culms 35 to 60 cm. tall, the nodes densely bearded; sheaths velvety-pubescent or the upper nearly glabrous; blades densely velvety-pubescent on both surfaces; panicle 6 to 8 cm. long; spikelets 2 mm. long, elliptic, pubescent. Autumnal phase suberect, bearing in late autumn a few short erect branches at the upper nodes. ♀ —Dry woods, Coastal Plain, rare, Massachusetts to Florida and Mississippi; Michigan; Missouri.

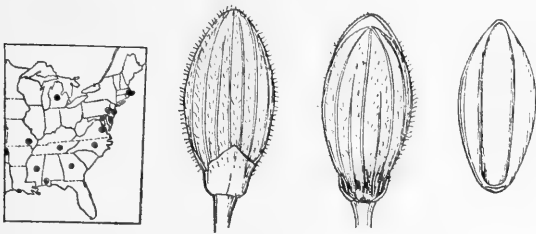


FIGURE 938.—*Panicum annulum*. Two views of spikelet, and floret, $\times 10$. (Type.)

30. *Panicum mattamuskeetense* Ashe. (Fig. 939.) Vernal phase olivaceous, usually tinged with purple; culms erect, often 1 m. tall, the nodes bearded or the upper puberulent only; sheaths velvety-pilose or the upper sometimes glabrous; blades horizontally spreading, 8 to 12 cm. long, 8 to 12 mm. wide, velvety-pubescent, or the upper glabrous; panicle 8 to 10 cm. long, many-flow-

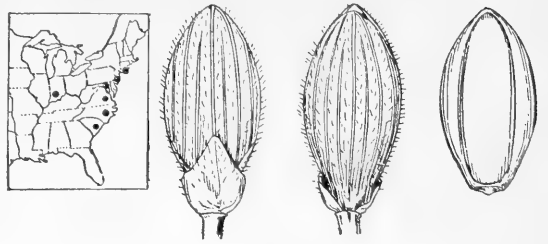


FIGURE 939.—*Panicum mattamuskeetense*. Two views of spikelet, and floret, $\times 10$. (Type coll.)

ered; spikelets about 2.5 mm. long, elliptic, pubescent. Autumnal phase erect or leaning, branching rather sparingly from the middle nodes, ♀ —Low moist ground, Coastal Plain, New York to South Carolina; Indiana.

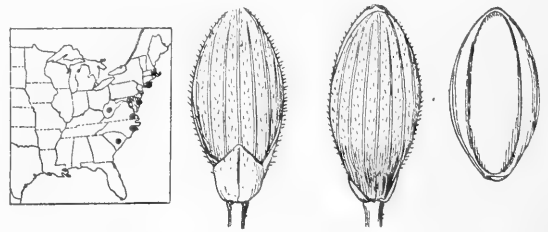


FIGURE 940.—*Panicum clutei*. Two views of spikelet, and floret, $\times 10$. (Type.)

31. *Panicum clútei* Nash. (Fig. 940.) Similar to *P. mattamuskeetense* but less pubescent, only the lowermost nodes, sheaths, and blades velvety; spikelets 2.2 to 2.3 mm. long. ♀ —Low moist ground and cranberry bogs, Massachusetts to South Carolina; West Virginia. Intergrades with *P. mattamuskeetense*.

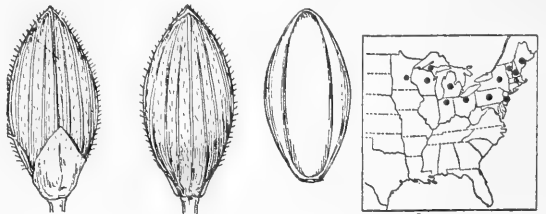


FIGURE 941.—*Panicum boreale*. Two views of spikelet, and floret, $\times 10$. (Type.)

32. *Panicum boreále* Nash. (Fig. 941.) Vernal culms usually erect, 30 to 50 cm. tall, the nodes mostly glabrous; blades erect or sometimes spreading, 7 to 12 mm. wide, sparsely ciliate at the rounded base; panicle loosely rather few-flowered, 5 to 10

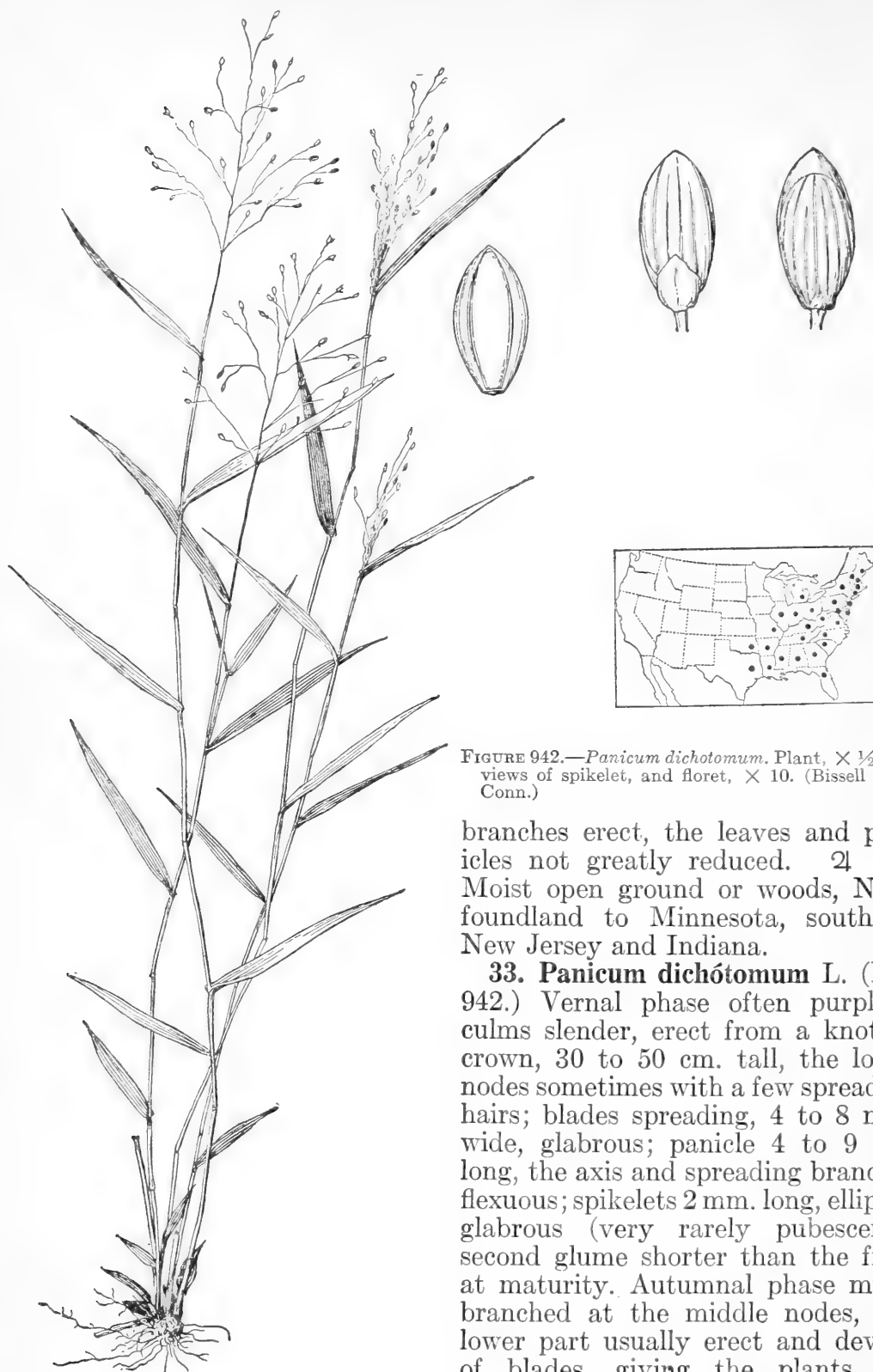


FIGURE 942.—*Panicum dichotomum*. Plant, $\times \frac{1}{2}$; two views of spikelet, and floret, $\times 10$. (Bissell 5576, Conn.)

branches erect, the leaves and panicles not greatly reduced. 2 — Moist open ground or woods, Newfoundland to Minnesota, south to New Jersey and Indiana.

33. *Panicum dichotomum* L. (Fig. 942.) Vernal phase often purplish; culms slender, erect from a knotted crown, 30 to 50 cm. tall, the lower nodes sometimes with a few spreading hairs; blades spreading, 4 to 8 mm. wide, glabrous; panicle 4 to 9 cm. long, the axis and spreading branches flexuous; spikelets 2 mm. long, elliptic, glabrous (very rarely pubescent); second glume shorter than the fruit at maturity. Autumnal phase much branched at the middle nodes, the lower part usually erect and devoid of blades, giving the plants the appearance of diminutive trees; blades numerous, often involute. 2 — Dry or sterile woods, New Brunswick to Illinois, south to Florida and eastern Texas.

cm. long; spikelets 2 to 2.2 mm. long, elliptic, pubescent. Autumnal phase erect or leaning, sparingly branching from all the nodes in late summer, the

34. *Panicum barbulatum* Michx. (Fig. 943.) Vernal phase, resembling that of *P. dichotomum*, the culms 50 to 80 cm. tall, the lower nodes usually bearded; blades slightly wider, panicle slightly larger, spikelets 2 mm. long, glabrous; second glume as long as the fruit at maturity. Autumnal phase diffusely branched, forming very large topheavy reclining bunches, the slender branches recurved, the numerous flat blades horizontally spreading. ♀ —Sterile or rocky woods, Massachusetts to Michigan and Missouri, south to Georgia and eastern Texas. This species seems to intergrade with *P. dichotomum*, but typically the autumnal phases are distinctly different. The vernal culms of *P. barbulatum* are usually more robust and the lower nodes are rather strongly bearded.

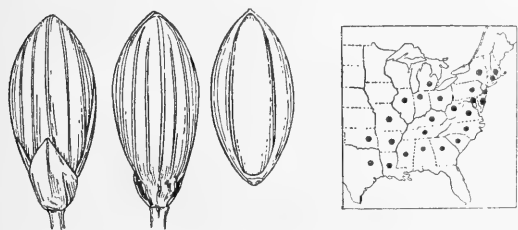


FIGURE 943.—*Panicum barbulatum*. Two views of spikelet, and floret, $\times 10$. (Type.)

35. *Panicum yadkinense* Ashe. (Fig. 944.) Vernal phase similar to that of *P. dichotomum*, the culms sometimes 1 m. tall; sheaths bearing pale glandular spots; blades longer and 8 to 11 mm. wide; panicle 10 to 12 cm. long; spikelets 2.3 to 2.5 mm. long, elliptic to subfusiform, pointed a little beyond the fruit, glabrous. Autumnal phase erect or leaning, loosely branching from the middle nodes, the blades not conspicuously reduced. ♀ —Moist woods and thickets, Pennsylvania to Michigan and Illinois, south to Georgia and Texas. Named from Yadkin River, N. C.

36. *Panicum roanokense* Ashe. (Fig. 945.) Vernal phase somewhat glaucous olive green; culms erect or ascending, 50 to 100 cm. tall; blades

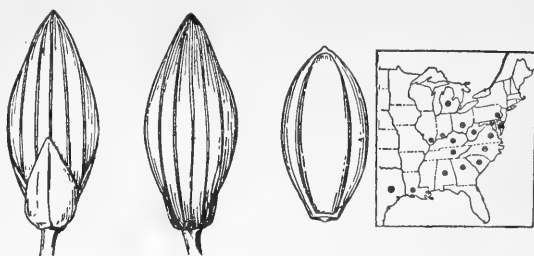


FIGURE 944.—*Panicum yadkinense*. Two views of spikelet, and floret, $\times 10$. (Type coll.)

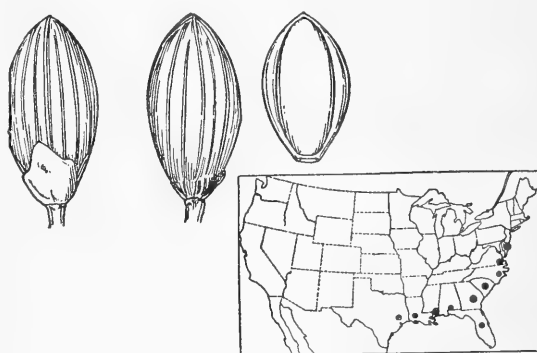


FIGURE 945.—*Panicum roanokense*. Two views of spikelet, and floret, $\times 10$. (Ashe, N. C.)

at first stiffly erect, later somewhat spreading, 3 to 8 mm. wide, glabrous; panicle 4 to 8 cm. long; spikelets 2 mm. long, turgid, elliptic, glabrous, the second glume often purple at base. Autumnal phase erect or decumbent, branching at the middle and upper nodes, the branches numerous but not in tufts, the reduced blades subinvolute. ♀ —Open swampy woods or wet peaty meadows, Coastal Plain, southeastern Delaware to Florida and Texas; Jamaica.

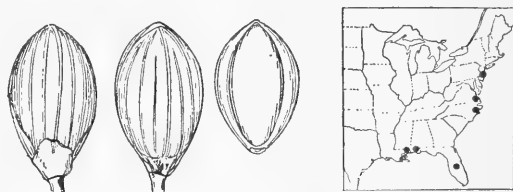


FIGURE 946.—*Panicum caeruleascens*. Two views of spikelet, and floret, $\times 10$. (Type.)

37. *Panicum caeruleascens* Hack. ex Hitchc. (Fig. 946.) Vernal phase similar to that of *P. roanokense*; culms more slender; blades ascending or spreading, commonly purplish beneath; panicle 3 to 7 cm. long; spikelets 1.5 to 1.6 mm. long, obovoid, turgid, glabrous. Autumnal

phase erect or leaning, producing short densely fascicled branches at the middle and upper nodes, these tufts scarcely as long as the primary internodes. 2 —Marshes and swampy woods, Coastal Plain, southern New Jersey to Florida and Louisiana; Cuba.

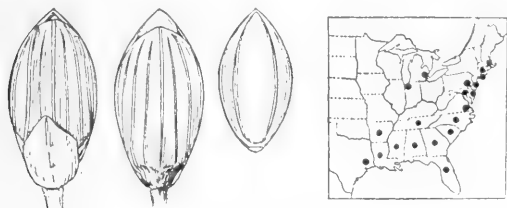


FIGURE 947.—*Panicum lucidum*. Two views of spikelet, and floret, $\times 10$. (Type.)

38. *Panicum lúcidum* Ashe. (Fig. 947.) Vernal phase at first erect and resembling that of *P. dichotomum*, but the weak culms soon decumbent; blades thin, shining, bright green, glabrous, at first erect but soon widely spreading, 4 to 6 mm. wide; panicle resembling that of *P. dichotomum* but fewer-flowered; spikelets 2 to 2.1 mm. long, elliptic, glabrous (rarely pubescent), the tip of the fruit exposed at maturity. Autumnal phase repeatedly branching, forming large clumps or mats of slender weak vinelike culms, the branches elongate and diverging at a wide angle, not fascicled, the blades waxy, flat, spreading. 2 —Wet woods and sphagnum swamps, Coastal Plain, Massachusetts to Florida, Arkansas, and Texas; Indiana (near Lake Michigan), Michigan (Port Huron). *P. LUCIDUM* var. *OPÁCUM* Fernald. Blades not glossy. Virginia.

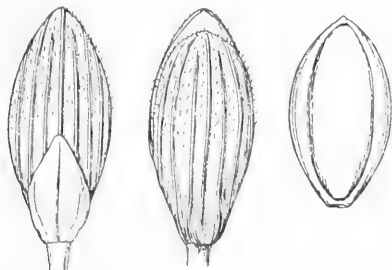


FIGURE 948.—*Panicum sphagnicola*. Two views of spikelet, and floret, $\times 10$. (Type.)

39. *Panicum sphagnicola* Nash. (Fig. 948.) Vernal phase grayish olive green; culms strongly flattened, erect or reclining, 50 to 100 cm. tall; sheaths soon divaricate; blades glabrous, 3 to 7 mm. wide; panicle narrow, 5 to 6 cm. long; spikelets 2.5 mm. long, elliptic, glabrous or minutely pubescent toward the summit. Autumnal phase decumbent or finally prostrate-spreading, divaricately branching from all the nodes, the branches slender, elongate. 2 —Edges of cypress swamps, in sphagnum bogs, and in similar moist shady places, southern Georgia and Florida.

7. *Spréta*.—Culms tufted, rather stiff, mostly glabrous or nearly so; ligules densely hairy, 2 to 5 mm. long; blades mostly firm; spikelets 5- to 7-nerved, mostly pubescent. Autumnal culms with rather short-tufted branchlets and greatly reduced leaves and panicles.

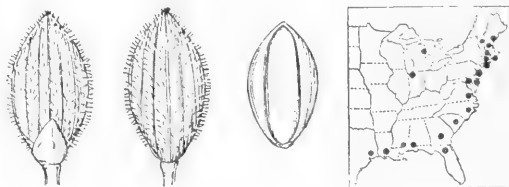


FIGURE 949.—*Panicum sprétum*. Two views of spikelet, and floret, $\times 10$. (Type.)

40. *Panicum sprétum* Schult. (Fig. 949.) Vernal culms 30 to 90 cm. tall, erect; sheaths glabrous; ligule 2 to 3 mm. long; blades firm, ascending to reflexed, 4 to 8 mm. wide, sparingly ciliate around the base; panicle 8 to 12 cm. long, the branches ascending or appressed; spikelets about 1.5 mm. long, elliptic, rarely glabrous. Autumnal phase mostly reclining, the early branches elongate, the subsequent branches in short fascicles. 2 —Wet usually sandy soil, Coastal Plain, Nova Scotia to Florida and Texas; Indiana and Michigan.

41. *Panicum lindhéimeri* Nash. (Fig. 950.) Vernal culms ascending or spreading, 30 to 100 cm. tall, the lower internodes and sheaths some-

times ascending-pubescent; ligule 4 to 5 mm. long; blades 6 to 8 mm. wide, glabrous; panicle 4 to 7 cm. long, about as wide; spikelets 1.4 to 1.6 mm. long, obovate. Autumnal phase usually stiffly spreading or radiate-prostrate, with elongate internodes and tufts of short appressed branches; blades involute-pointed, often conspicuously ciliate at base. 2 — Dry sandy or sterile woods or open ground, Quebec and Maine to Minnesota, south to northern Florida and New Mexico; California.



FIGURE 950.—*Panicum lindheimeri*. Plant, $\times 1$; two views of spikelet, and floret, $\times 10$. (Chase 4449, Miss.)

42. *Panicum leucothrix* Nash. (Fig. 951.) Vernal phase light olive green; culms 25 to 45 cm. tall, erect or ascending, appressed papillose-pilose, the nodes pubescent; sheaths papillose-pilose; ligule 3 mm. long; blades 3 to 7 mm. wide, glabrous or sparsely villous on the upper surface, velvety-puberulent beneath; panicle 3 to 8 cm. long, rather densely flowered; spikelets 1.2 to 1.3 mm. long, densely papillose-pubescent. Autumnal culms at first sending out from lower and

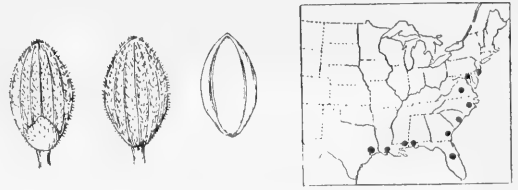


FIGURE 951.—*Panicum leucothrix*. Two views of spikelet, and floret, $\times 10$. (Type.)

middle nodes long branches similar to primary culms, later producing more or less fascicled branches. 2 — Low pinelands, Coastal Plain, New Jersey to Florida and Texas; Tennessee; West Indies; Colombia.

43. *Panicum longiligulátum* Nash. (Fig. 952.) Vernal culms 30 to 70 cm. tall; sheaths glabrous; ligule 2 to 3 mm. long; blades 4 to 8 mm. wide, glabrous on the upper surface, puberulent beneath; panicle 3 to 8 cm. long, the slender branches stiffly ascending; spikelets 1.1 to 1.2 mm. long. Autumnal culms reclining, the branches spreading, the branchlets crowded, the blades subinvolute. 2 — Low pine barrens and swamps, Coastal Plain, Pennsylvania (Bucks County), Delaware to Florida and Texas; Tennessee; Central America.

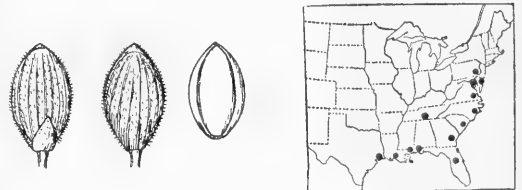


FIGURE 952.—*Panicum longiligulatum*. Two views of spikelet, and floret, $\times 10$. (Type.)

44. *Panicum wrightianum* Scribn. (Fig. 953.) Vernal culms weak, slender, ascending from a decumbent base, 15 to 60 cm. tall, minutely puberulent; sheaths glabrous or puberulent; ligule 2 to 3 mm. long; blades 2 to 4 cm. long, 3 to 5 mm. wide, glabrous or puberulent beneath and minutely pilose above; panicle 3 to 6 cm. long; spikelets 1 mm. long. Autumnal culms decumbent-spreading, sending out from lower and middle nodes numerous ascending branches, becoming bushy-branched, the flat or subinvolute

blades and secondary panicles not greatly reduced. ♀ —Margins of streams and ponds in sandy or mucky soil, Coastal Plain, Massachusetts to Florida and Mississippi; Cuba and Central America.

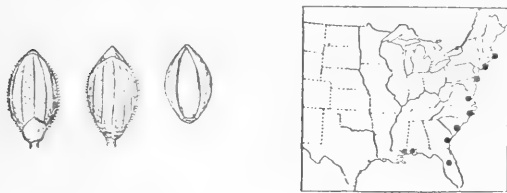


FIGURE 953.—*Panicum wrightianum*. Two views of spikelet, and floret, $\times 10$. (Type.)

8. **Lanuginósa**.—Mostly pubescent throughout; ligules densely hairy, 2 to 5 mm. long; spikelets 5- to 9-nerved, pubescent. Autumnal culms usually freely branching, the leaves and panicles mostly greatly reduced.

45. ***Panicum meridionale*** Ashe. (Fig. 954.) Vernal culms 15 to 40 cm. tall, the lower internodes and sheaths pilose, the upper minutely appressed-pubescent; ligule 3 to 4 mm. long; blades 1.5 to 3 cm. long, 2 to 4 mm. wide, long-pilose on the upper surface, the hairs erect; panicle 1.5 to 4 cm. long, the axis appressed-pubescent to glabrous; spikelets 1.3 to 1.4 mm. long. Autumnal culms erect, with fascicled branchlets from all the nodes; leaves and panicles not greatly reduced. ♀ —Sandy or sterile woods and clearings, Nova Scotia to Minnesota, south to Alabama.

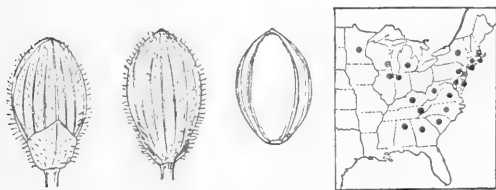


FIGURE 954.—*Panicum meridionale*. Two views of spikelet, and floret, $\times 10$. (Type.)

46. ***Panicum albemarlense*** Ashe. (Fig. 955.) Vernal phase olivaceous, grayish-villous throughout; culms 25 to 45 cm. tall, at first erect, soon geniculate and spreading; blades 3 to

6 mm. wide, the upper surface puberulent as well as long-villous; panicle 3 to 5 cm. long, the axis puberulent; spikelets 1.4 mm. long, pilose. Autumnal culms widely decumbent, spreading or ascending, freely branching at all but the uppermost nodes, the branches narrowly ascending. ♀ —Low sandy woods or open ground, Coastal Plain, Massachusetts to North Carolina; Indiana to Minnesota; West Virginia; Tennessee.



FIGURE 955.—*Panicum albemarlense*. Two views of spikelet, and floret, $\times 10$. (Type.)

47. ***Panicum implicatum*** Scribn. (Fig. 956.) Vernal culms slender, 20 to 55 cm. tall, erect or ascending, papillose-pilose with spreading hairs; sheaths papillose-pilose; ligule 4 to



FIGURE 956.—*Panicum implicatum*. Two views of spikelet, and floret, $\times 10$. (Type.)

5 mm. long; blades more or less involute-acuminate, the upper surface pilose with erect hairs 3 to 4 mm. long, appressed-pubescent beneath; panicle 3 to 6 cm. long, the axis long-pilose, the branches flexuous, in typical specimens tangled or implicate; spikelets 1.5 mm. long, papillose-pilose. Autumnal culms erect or spreading, loosely branching from the lower and middle nodes. ♀ —Wet meadows, bogs, and sandy soil, cedar and hemlock swamps,

Newfoundland to Minnesota, south to Delaware, Tennessee, and Missouri.

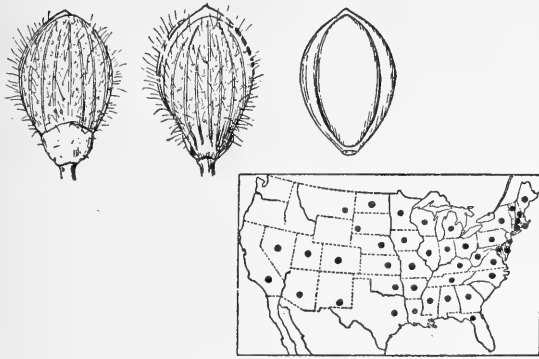


FIGURE 957.—*Panicum huachucae*. Two views of spikelet, and floret, $\times 10$. (Type.)

48. *Panicum huachucae* Ashe. (Fig. 957.) Vernal phase light olivaceous, often purplish, harsh to the touch from copious spreading papillose pubescence; culms usually stiffly upright, 20 to 60 cm. tall, the nodes bearded with spreading hairs; ligule 3 to 4 mm. long; blades firm, stiffly erect or ascending, 4 to 8 cm. long, 6 to 8 mm. wide, the upper surface copiously short-pilose, the lower densely pubescent; panicle 4 to 6 cm. long, the axis and often the branches pilose; spikelets 1.6 to 1.8 mm. long, obovate, papillose-pubescent. Autumnal culms stiffly erect or ascending, the branches fascicled, the crowded blades ascending, 2 to 3 cm. long, much exceeding the panicles. ♀ —Prairies and open ground, Nova Scotia to Montana, south to North Carolina and Texas, westward here and there to southern California. Naturalized in China and Japan.

PANICUM HUACHUCAE var. *FASCICULATUM* (Torr.) Hubb. Vernal culms taller, more slender, less pubescent, the culms 30 to 75 cm. tall; blades thin, lax, spreading, 5 to 10 cm. long, 6 to 12 mm. wide, the upper surface sparsely short-pilose or with copious long hairs toward the base, the lower surface pubescent and with a satiny luster. Autumnal culms more or less decumbent with numerous fascicled branches. ♀ (*P. huachucae* var.

silvicola Hitchc. and Chase.)—Open woods and clearings, Quebec to Minnesota and Nebraska, south to northern Florida and Texas; Arizona (Tucson).

Panicum huachucae, *P. huachucae* var. *fasciculatum*, *P. tennesseense*, and *P. pacificum* intergrade more or less. The descriptions apply to the great bulk of specimens, but the distinctions fail to hold for occasional specimens.

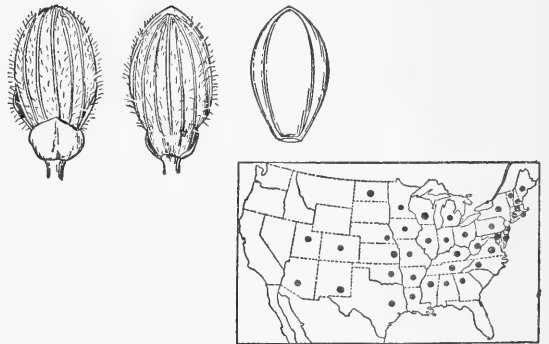


FIGURE 958.—*Panicum tennesseense*. Two views of spikelet, and floret, $\times 10$. (Type.)

49. *Panicum tennesseense* Ashe. (Fig. 958.) Vernal phase bluish green; culms suberect or stiffly spreading, 25 to 60 cm. tall, papillose-pilose or the upper portion glabrous; ligule dense, 4 to 5 mm. long; blades firm, with a thin white cartilaginous margin, 5 to 8 mm. wide, the upper surface glabrous or with a few long hairs toward the base, the lower surface appressed-pubescent or nearly glabrous; panicle 4 to 7 cm. long; spikelets 1.6 to 1.7 mm. long. Autumnal culms widely spreading or decumbent, with numerous fascicled somewhat flabellate branches, often forming prostrate mats; blades usually ciliate at base. ♀ —Open rather moist ground and borders of woods, Quebec to North Dakota, south to Georgia and Texas, and also at a few points west to Utah and Arizona.

50. *Panicum lanuginosum* Ell. (Fig. 959.) Vernal phase grayish olive green, velvety-villous throughout; culms usually in large clumps, 40 to 70 cm. tall, lax, spreading, often

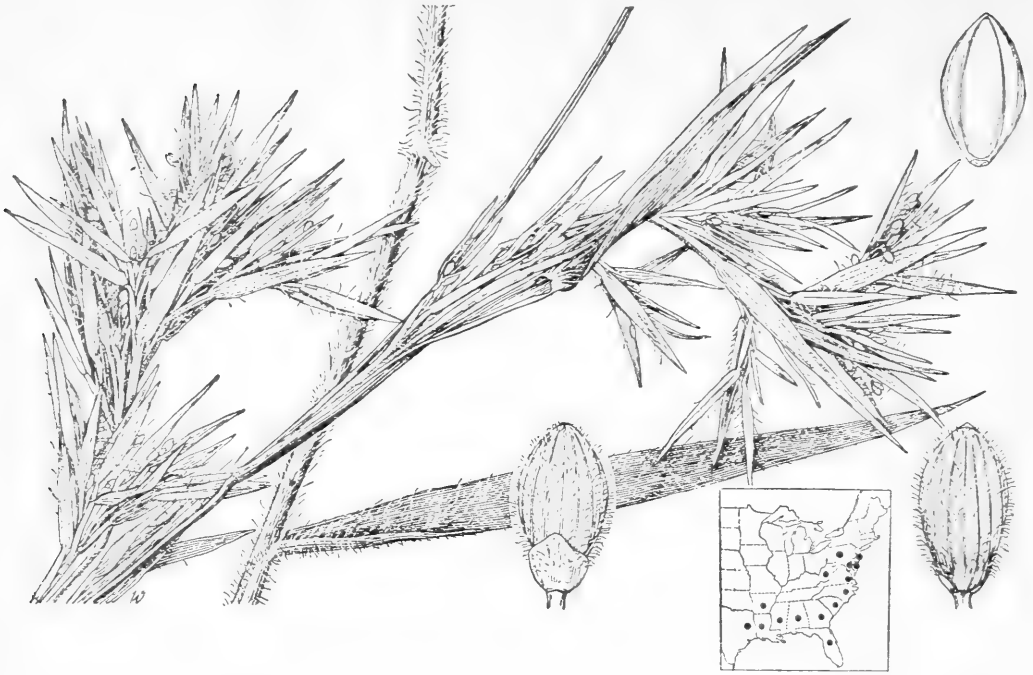


FIGURE 959.—*Panicum lanuginosum*. Plant, $\times 1$; two views of spikelet, and floret, $\times 10$. (Hitchcock, N. C.)

with a glabrous ring below the villous nodes; ligule 3 to 4 mm. long; blades thickish but not stiff, somewhat incurved or spoon-shaped (when fresh), 5 to 10 cm. long, 5 to 10 mm. wide; panicle 6 to 12 cm. long, the axis pubescent; spikelets 1.8 to 1.9 mm. long. Autumnal culms widely spreading or decumbent, freely branching from the middle nodes, the branches repeatedly branching and much exceeding the internodes, the ultimate branchlets forming flabellate fascicles. 2 —Moist sandy woods, Coastal Plain, New Jersey to Florida, Tennessee, Arkansas, and Texas. The plants have much the habit and pubescence of *P. scoparium*, but much smaller and more slender.

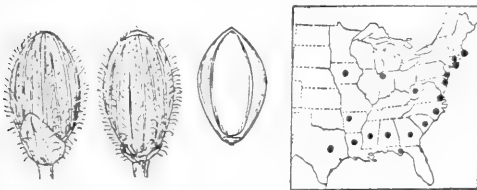


FIGURE 960.—*Panicum auburne*. Two views of spikelet, and floret, $\times 10$. (Type.)

51. *Panicum auburne* Ashe. (Fig. 960.) Vernal phase grayish velvety-villous throughout; culms 20 to 50

cm. tall, geniculate, widely spreading, soon becoming branched and decumbent; ligule 3 to 4 mm. long; blades 3 to 7 cm. long, 3 to 5 mm. wide; panicle 3 to 5 cm. long, the axis velvety; spikelets 1.3 to 1.4 mm. long. Autumnal culms early becoming diffusely branched at all the nodes, prostrate-spreading, forming large mats, the branches curved upward at the ends. 2 —Sandy pine and oak woods, Coastal Plain, Massachusetts to northern Florida, West Virginia; Arkansas and Texas; Indiana, near Lake Michigan, and Emmet County, Iowa.

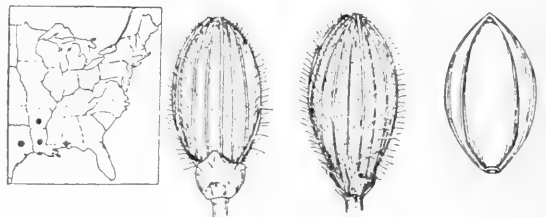


FIGURE 961.—*Panicum thuronii*. Two views of spikelet, and floret, $\times 10$. (Type.)

52. *Panicum thuronii* Scribn. and Smith. (Fig. 961.) Vernal phase bluish green but drying olive; culms 35 to 70 cm. tall, erect or ascending, villous, the nodes bearded, usually with

a glabrous ring below; sheaths sparsely to densely villous; ligule 4 mm. long; blades rather stiff, 6 to 10 mm. wide, the upper surface sparingly pilose toward the base and margins, otherwise glabrous, the lower surface velvety-villous; panicle 7 to 11 cm. long; spikelets 2 mm. long. Autumnal culms erect, bearing at the middle nodes a few appressed fascicles of branches. 2 —Prairies and dry open woods, Alabama (Mobile) to Texas and Arkansas.

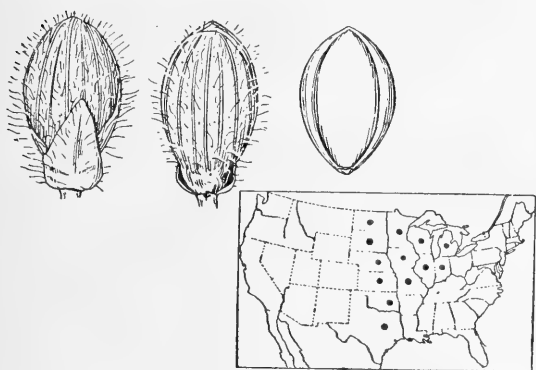


FIGURE 962.—*Panicum praecocius*. Two views of spikelet, and floret, $\times 10$. (Type.)

53. *Panicum praecocius* Hitchc. and Chase. (Fig. 962.) Vernal culms 15 to 25 cm. tall, at first erect and simple, soon branching and geniculate, becoming 30 to 45 cm. long, papillose-pilose with weak spreading hairs 3 to 4 mm. long; sheaths pilose; ligule 3 to 4 mm. long; blades 5 to 9 cm. long, 4 to 6 mm. wide, long-pilose on both surfaces, the hairs on the upper surface 4 to 5 mm. long, erect; panicle 4 to 6 cm. long, the axis pilose; spikelets 1.8 to 1.9 mm. long, pilose. Autumnal culms in close bunches, 10 to 20 cm. tall, the branches appressed, the scarcely reduced blades erect. 2 —Dry prairies and clearings, Michigan to North Dakota, south to Arkansas and eastern Texas.

54. *Panicum subvillosum* Ashe. (Fig. 963.) Vernal culms leafy below, 10 to 45 cm. tall, ascending or spreading, pilose, the nodes short-bearded; sheaths sparsely pilose with ascending hairs; ligule 3 mm. long; blades 4 to 6 cm. long, 4 to 6 mm. wide, both

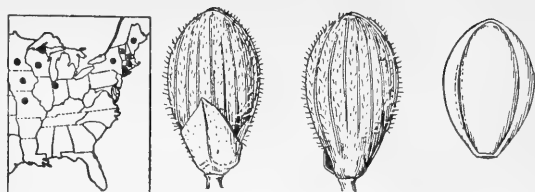


FIGURE 963.—*Panicum subvillosum*. Two views of spikelet, and floret, $\times 10$. (Type.)

surfaces pilose, the hairs on the upper surface 3 to 5 mm. long; panicle long-exserted, 3 to 5 cm. long; spikelets 1.8 to 1.9 mm. long. Autumnal culms widely spreading or prostrate, sparingly branching from the lower nodes, the leaves and panicles not greatly reduced. 2 —Dry woods and sandy ground, Nova Scotia to Minnesota, south to Connecticut, Indiana, and Missouri.

55. *Panicum occidentale* Scribn. (Fig. 964.) Vernal culms yellowish green, leafy toward base, 15 to 40 cm. tall, spreading, sparsely pubescent; sheaths sparsely pubescent; ligule 3 to 4 mm. long; blades firm, erect, or ascending, 4 to 8 cm. long, 5 to 7

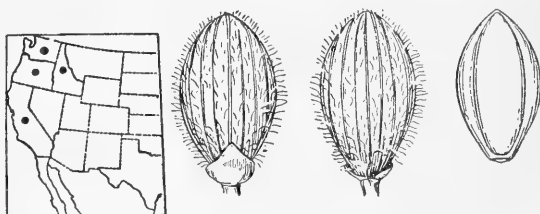


FIGURE 964.—*Panicum occidentale*. Two views of spikelet, and floret, $\times 10$. (Type.)

mm. wide, the upper surface nearly glabrous, the undersurface appressed-pubescent; panicle 4 to 7 cm. long; spikelets 1.8 mm. long. Autumnal culms branching from the lower nodes, forming a spreading tussock 10 to 15 cm. high; leaves and panicles reduced. 2 —Peat bogs and moist sandy ground, British Columbia and Idaho to southern California.

56. *Panicum pacificum* Hitchc. and Chase. (Fig. 965.) Vernal phase light green; culms 25 to 50 cm. tall, ascending or spreading, leafy, pilose, the nodes short-bearded; sheaths pilose; ligule 3 to 4 mm. long; blades erect or ascending, 5 to 10 cm. long, 5 to 8

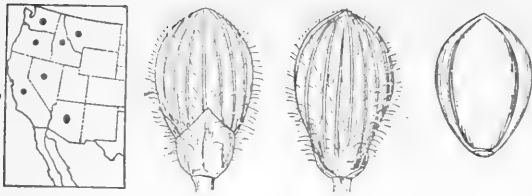


FIGURE 965.—*Panicum pacificum*. Two views of spikelet, and floret, $\times 10$. (Type.)

mm. wide, the upper surface pilose, the lower surface appressed-pubescent; panicle 5 to 10 cm. long; spikelets 1.8 to 2 mm. long. Autumnal culms prostrate spreading, repeatedly branching from the middle and upper nodes. ♀ —Sandy shores and slopes, and moist crevices of rocks, ascending to 1,600 m., British Columbia and Montana to southern California and Arizona.

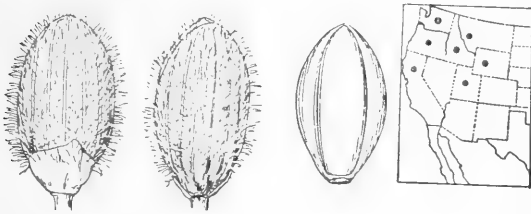
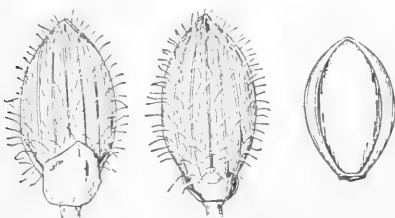


FIGURE 966.—*Panicum thermale*. Two views of spikelet, and floret, $\times 10$. (Type.)

57. *Panicum thermale* Boland. (Fig. 966.) Vernal phase grayish green, densely tufted, velvety-villous; culms 10 to 30 cm. tall, ascending or spreading, the nodes with a dense ring of short hairs; ligule 3 mm. long; blades thick, 3 to 8 cm. long, 5 to 12 mm. wide; panicle 3 to 6 cm. long, the axis villous; spikelets 1.9 to 2 mm. long, pilose. Autumnal culms widely spreading, repeatedly branching, the whole forming a dense cushion. ♀ —Wet saline soil in the immediate vicinity of geysers and hot springs, ascending to 2,500 m., Alberta to Washington, south to Wyoming, Utah, and California.



58. *Panicum languidum* Hitchc. and Chase. (Fig. 967.) Vernal culms 25 to 40 cm. tall, weak, slender, ascending or spreading, pilose; sheaths pilose; ligule 3 mm. long; blades thin, lax, ascending or spreading, 4 to 7 cm. long, 4 to 9 mm. wide, sparsely pilose on the upper surface, minutely appressed-pubescent beneath; panicle 3 to 6 cm. long, the axis and branches sparsely long-pilose; spikelets 2 mm. long, pilose. Autumnal culms decumbent, branching from all the nodes, forming a large loose straggling clump, the ultimate blades and panicles scarcely reduced. ♀ —Dry or sandy open woods, Maine, Massachusetts, Vermont, and eastern New York, apparently rare.

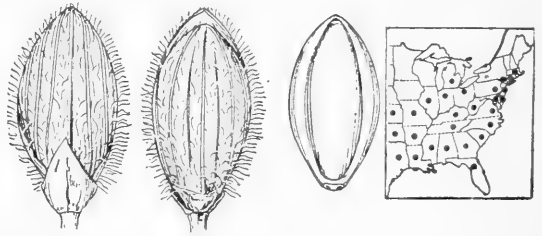


FIGURE 968.—*Panicum villosissimum*. Two views of spikelet, and floret, $\times 10$. (Type.)

59. *Panicum villosissimum* Nash. (Fig. 968.) Vernal phase light olive green; culms 25 to 45 cm. tall, erect or ascending, pilose with spreading hairs 3 mm. long; sheaths pilose; ligule 4 to 5 mm. long; blades rather firm, 6 to 10 cm. long, 5 to 10 mm. wide, pilose on both surfaces; panicle 4 to 8 cm. long, the branches stiffly ascending or spreading; spikelets 2.2 to 2.3 mm. long, pilose. Autumnal culms finally prostrate, the leaves of the fascicled branches appressed, giving the cluster or mat a combed-out appearance. ♀ —Dry sandy or sterile soil, open woods, and hillsides, Massachusetts to Michigan and Kansas, south to Florida and Texas; Guatemala.

60. *Panicum bénneri* Fernald. (Fig. 969.) Vernal phase light olive green; culms 20 to 35 cm. tall, papillose-

FIGURE 967.—*Panicum languidum*. Two views of spikelet, and floret, $\times 10$. (Type.)

pilose with ascending hairs; nodes inconspicuously bearded; sheaths papillose-pilose; ligule 2 to 3 mm. long; blades 4 to 6 cm. long, 4 to 8 mm. wide, glabrous or with a few long hairs toward the base on the upper surface, very sparsely appressed-pubescent beneath; panicle short-exserted, 3 to 6 cm. long, the axis and flexuous spreading branches pubescent; spikelets 2.2 to 2.5 mm. long, pilose. Autumnal phase unknown, young branches appearing before maturity of primary panicle. 2 — Only known from an old field along the Delaware River, about 1.5 miles east of Raven Rock, Hunterdon County, N. J. Insufficiently known, may be an exceptional specimen of *P. pseudopubescens*.

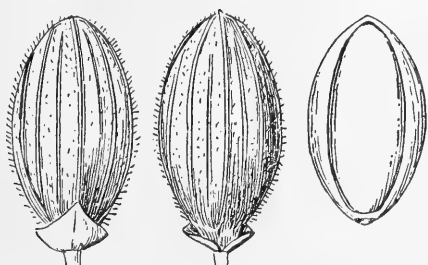


FIGURE 969.—*Panicum benneri*. Two views of spikelet, and floret, $\times 10$. (Type.)

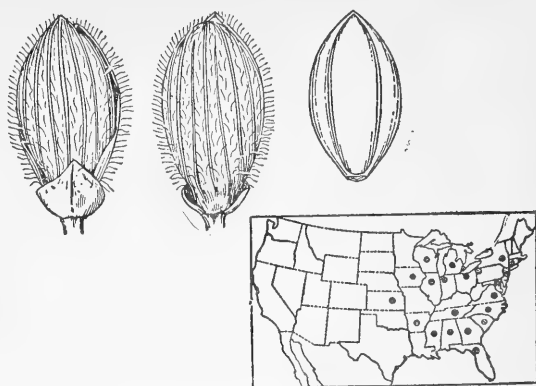


FIGURE 970.—*Panicum pseudopubescens*. Two views of spikelet, and floret, $\times 10$. (Type.)

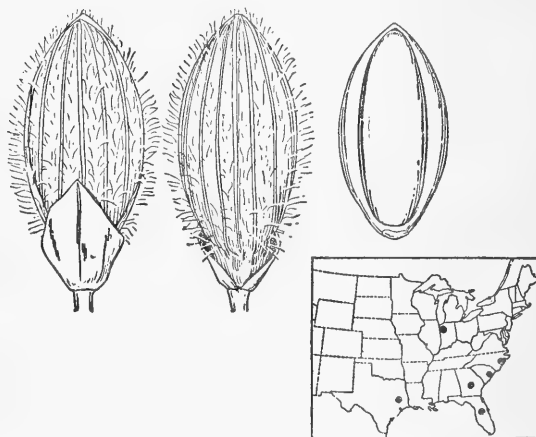


FIGURE 971.—*Panicum ovale*. Two views of spikelet, and floret, $\times 10$. (Type.)

61. *Panicum pseudopubescens* Nash. (Fig. 970.) Vernal phase similar to that of *P. villosissimum*; ligule 2 to 3 mm. long; blades with the pubescence on the upper surface short, sparse or wanting down the center, occasionally glabrous; spikelets 2.2 to 2.4 mm. long, pilose. Autumnal culms stiffly spreading, sometimes prostrate, sparingly branching from the middle and lower nodes. 2 — Sandy open woods, Connecticut to Wisconsin and Iowa south to Florida, Kansas, and Mississippi; Mexico.

62. *Panicum ovale* Ell. (Fig. 971.) Vernal culms 20 to 50 cm. tall, erect or ascending, rather stout, long-pilose below with ascending or appressed hairs, often nearly glabrous above, the nodes bearded; sheaths ascending-pilose; ligule 2 to 3 mm. long, rather sparse; blades 5 to 10 mm. wide, the

upper surface nearly glabrous except for long hairs near the base and margins, the lower surface appressed-pubescent; panicle 5 to 9 cm. long; spikelets, 2.7 to 2.9 mm. long. Autumnal phase spreading-decumbent, the stiff culms rather loosely branching from the middle and upper nodes. 2 — Dry sandy woods, Coastal Plain, North Carolina to Florida; Indiana (near Lake Michigan), Illinois (Mason County), and Texas (Waller County).

63. *Panicum scoparioides* Ashe. (Fig. 972.) Vernal phase light green; culms 30 to 50 cm. tall, erect or ascending, pilose with ascending hairs or nearly glabrous; sheaths pilose to nearly glabrous; ligule 2 to 3 mm. long; blades 6 to 10 mm. wide, sparsely hispid on the upper surface, appressed-pubescent beneath; panicle 4 to 7 cm. long; spikelets 2.2 to 2.3 mm. long, pubescent. Autumnal



FIGURE 972.—*Panicum scoparioides*. Two views of spikelet, and floret, $\times 10$. (Type.)

culms erect or spreading, sparingly branching from the upper and middle nodes. 2 —Dry sandy or gravelly soil, Vermont to Delaware; Indiana and Michigan to Minnesota, Iowa, and Kansas.

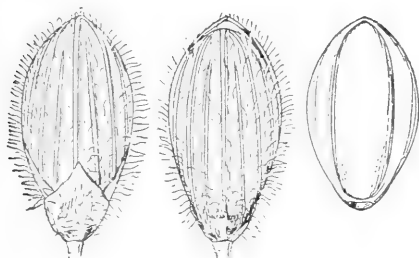


FIGURE 973.—*Panicum shastense*. Two views of spikelet, and floret, $\times 10$. (Type.)

64. *Panicum shastense* Scribn. and Merr. (Fig. 973.) Vernal culms 30 to 50 cm. tall, pilose with ascending hairs, the nodes short-bearded; sheaths papillose-pilose, the hairs spreading; ligule sparse, 2 to 3 mm. long; blades 6 to 8 mm. wide, sparsely pilose on the upper surface, pilose beneath; panicle 6 to 8 cm. long; spikelets 2.4 to 2.6 mm. long. Autumnal culms spreading, with geniculate nodes and elongate arched internodes, rather sparingly branched from the middle nodes. 2 —Moist meadows. Known only from Castle Crag, Shasta County, Calif.

9. *Columbiána*.—Culms and sheaths appressed-pubescent to crisp-puberulent, the culms stiff; ligules mostly less than 1 mm. long (sometimes to 1.5 mm. in

P. tsugetorum and *P. oricola*); blades firm, thick, stiffly ascending; spikelets 5- to 9-nerved, pubescent, the first glume mostly one-third to half as long as the spikelet. Autumnal culms freely branching, the branches and stiff blades mostly appressed.

65. *Panicum málacon* Nash. (Fig. 974.) Vernal culms erect to stiffly spreading, purplish olive green; culms and sheaths appressed-pubescent, the culms 30 to 50 cm. tall; blades 3 to 5 mm. wide, sharply acuminate, pu-

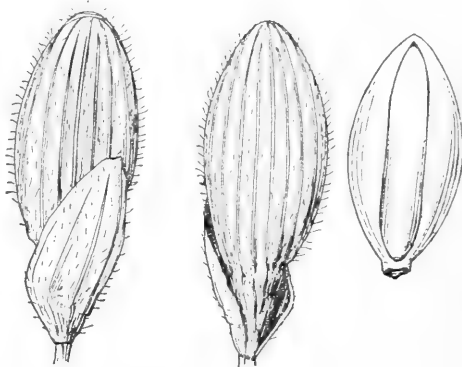


FIGURE 974.—*Panicum malacon*. Two views of spikelet, and floret, $\times 10$. (Type.)

berulent beneath, puberulent to glabrous above; panicle 4 to 7 cm. long, the branches few, stiffly ascending, the pedicels long and stiff; spikelets 3 to 3.2 mm. long, obovate, the first glume distant, about half as long as the spikelet. Autumnal culms subdecumbent-spreading, branching from the lower and middle nodes, the branches appressed. 2 —Dry pine woods, high pineland, North Carolina (Wilmington); Georgia and Florida; Texas.

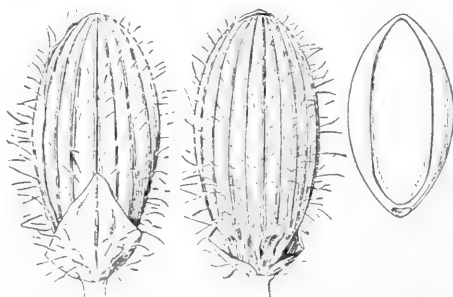


FIGURE 975.—*Panicum deamii*. Two views of spikelet, and floret, $\times 10$. (Type.)

66. *Panicum deámii* Hitchc. and Chase. (Fig. 975.) Vernal phase yellowish green; culms 25 to 35 cm. tall, erect or ascending, papillose-pilose; sheaths papillose-villous, densely so at base and summit; blades suberect, 8 to 15 cm. long, 4 to 6 mm. wide, sparsely villous on the upper surface, appressed-pilose beneath; panicle rather short-exserted, 6 to 10 cm. long, the branches ascending; spikelets 2.8 to 2.9 mm. long, pilose. Autumnal culms branching from the middle and upper nodes, forming a somewhat bushy summit, the culms sprawling. 2 — Sand dunes and sandy woods, northern Indiana and Iowa.

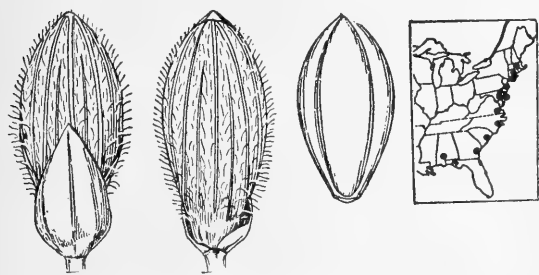


FIGURE 976.—*Panicum commonsianum*. Two views of spikelet, and floret, $\times 10$. (Type.)

67. *Panicum commonsianum* Ashe. (Fig. 976.) Vernal phase greenish olive, drying brownish; culms and sheaths appressed-pilose, the culms 20 to 50 cm. tall, ascending or spreading, appressed-pilose; blades 4 to 7 mm. wide, broadest near the rounded base, glabrous or nearly so on the upper surface, strigose or glabrous beneath; panicle 4 to 8 cm. long, the branches stiffly spreading; spikelets 2.2 to 2.4 mm. long. Autumnal culms branching from the middle and upper nodes, finally spreading or prostrate in mats. 2 — Dunes and sandy woods near the coast, Massachusetts to northern Florida and Alabama.

68. *Panicum addisoni* Nash. (Fig. 977.) Vernal phase similar to that of *P. commonsianum*; culms usually less than 40 cm. tall, appressed-pilose below, puberulent above; sheaths sparsely ascending-pilose, blades 3 to 6 mm. wide, glabrous on the upper



FIGURE 977.—*Panicum addisoni*. Two views of spikelet, and floret, $\times 10$. (Type.)

surface, pubescent or glabrous beneath; panicle 2 to 6 cm. long, more densely flowered than in *P. commonsianum*; spikelets about 2 mm. long. Autumnal culms more or less spreading, rather freely branching from all the nodes, the branches appressed. 2 — Sand barrens, Coastal Plain, Massachusetts to South Carolina; Indiana. Closely approaching *P. commonsianum* but having smaller spikelets.

69. *Panicum wilmingtónense* Ashe. (Fig. 978.) Vernal phase bluish green, culms solitary or in small tufts, slender, erect from an ascending base, 20

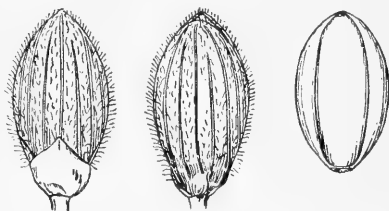


FIGURE 978.—*Panicum wilmingtónense*. Two views of spikelet, and floret, $\times 10$. (Type.)

to 40 cm. tall, pilose with soft ascending hairs; sheaths pubescent like the culms, densely villous-ciliate at the summit; blades 3 to 7 cm. long, glabrous on the upper surface, softly pubescent or nearly glabrous beneath, strongly ciliate near the base, the thick cartilaginous margin white when dry; panicle 5 to 8 cm. long; spikelets 2 mm. long. Autumnal culms spreading, branching from the middle and upper nodes. 2 — Sandy woods, North Carolina, South Carolina, and Alabama, rare.

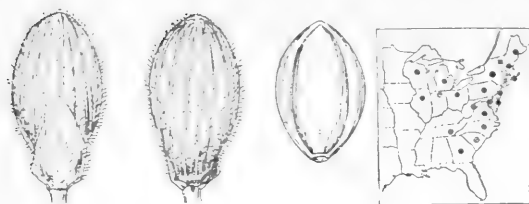


FIGURE 979.—*Panicum tsugetorum*. Two views of spikelet, and floret, $\times 10$. (Type.)

70. *Panicum tsugetorum* Nash. (Fig. 979.) Vernal phase usually pale bluish green; culms 30 to 50 cm. tall, spreading or ascending, the lower nodes often geniculate, densely appressed-pubescent with short crisp hairs, long hairs more or less intermixed; sheaths pubescent like the culm; ligule 1 to 1.5 mm. long; blades 4 to 7 mm. wide, glabrous or nearly so on the upper surface, appressed-pubescent beneath; panicle 3 to 7 cm. long; spikelets 1.8 to 1.9 mm. long. Autumnal culms decumbent-spreading, branching from the lower and middle nodes. ♀ —Sandy woods, Maine to Wisconsin, south to Georgia and Tennessee.



FIGURE 980.—*Panicum columbianum*. Plant, $\times 1$; two views of spikelet, and floret, $\times 10$. (Type.)

71. *Panicum columbianum* Scribn. (Fig. 980.) Vernal culms 15 to 50 cm. tall, ascending, densely crisp-puberulent; sheaths less pubescent than the

culms; blades 3 to 6 cm. long, 3 to 5 mm. wide, usually glabrous on the upper surface, appressed-puberulent or glabrous beneath; panicle 2 to 4 cm. long; spikelets 1.5 to 1.6 mm. long. Autumnal culms branching from the middle and upper nodes, becoming widely spreading or decumbent at base. ♀ —Sandy woods and open ground, Maine to North Carolina; Indiana and Michigan.

**PANICUM COLUMBIANUM var. THIN-
IUM** Hitchc. and Chase. Vernal culms more slender, usually about 20 cm. tall; blades rarely more than 3 cm. long, sparsely pilose with long hairs on the upper surface; panicle 1.5 to 4 cm. long; spikelets 1.3 to 1.4 mm. long. Autumnal culms with branches crowded and aggregate toward the summit. ♀ —Dry sand, Massachusetts to North Carolina; Tennessee.

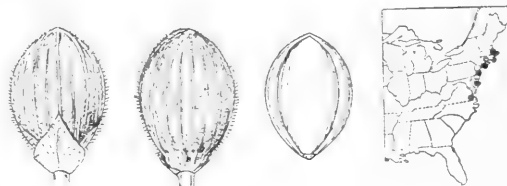


FIGURE 981.—*Panicum oricola*. Two views of spikelet, and floret, $\times 10$. (Type.)

72. *Panicum oricola* Hitchc. and Chase. (Fig. 981.) Vernal phase grayish, often purplish; culms and sheaths appressed-pilose, the culms 10 to 30 cm. tall, spreading; ligule 1 to 1.5 mm. long; blades 2 to 5 cm. long, 2 to 4 mm. wide, the upper surface pilose with hairs 3 to 5 mm. long, the lower surface appressed-pilose; panicle short-exserted, ovoid, 1.8 to 3 cm. long, rather densely flowered; spikelets 1.5 mm. long, broadly obovate, turgid. Autumnal culms prostrate, forming mats, with short fascicled branches at all the nodes. ♀ —Sand barrens along the coast, Massachusetts to Virginia.

10. *Sphaerocarpa*.—Glabrous as a whole; culms few in a tuft, relatively stout; ligules obsolete or nearly so; blades mostly thick, firm, cartilaginous-margined, cor-

date and ciliate at base, panicle branches mostly viscid; spikelets obovoid-spherical at maturity, oval when young, 5- to 7-nerved, puberulent. Autumnal culms remaining simple or only sparingly branching, the thick white-margined blades of the winter rosette conspicuous.

73. *Panicum sphaerocarpon* Ell. (Fig. 982.) Vernal phase light green; culms 20 to 80 cm. tall, radiate-spreading, sometimes nearly erect, the nodes appressed-pubescent; blades 7 to 14 mm. wide; panicle 5 to 10 cm. long, about as wide; spikelets 1.6 to 1.8 mm. long. Autumnal phase prostrate-spreading, sparingly branched late in the season from the lower and middle nodes, the branches short, mostly simple. ♀ —Sandy soil, Vermont to Kansas, south to north-

ern Florida and Texas; Mexico to Venezuela. *PANICUM SPHAEROCARPON* var. *INFLÁTUM* (Scribn. and Smith) Hitchc. and Chase. Differing from *P. sphaerocarpon* in having a ligule as much as 1 mm. long, spikelets 1.4 to 1.5 mm. long, and more freely branching autumnal culms; many intergrades occur. ♀ —Moist sandy soil, Coastal Plain, Delaware to Florida and Texas, north to Oklahoma and Missouri.

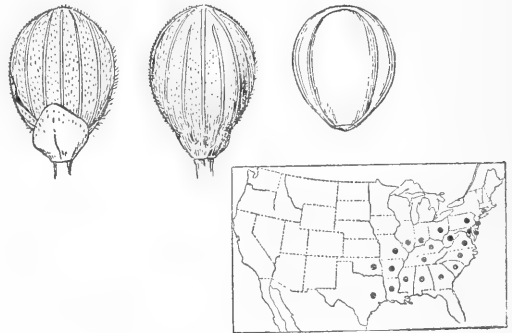


FIGURE 983.—*Panicum polyanthes*. Two views of spikelet, and floret, $\times 10$. (Type.)

74. *Panicum polyanthes* Schult. (Fig. 983.) Vernal culms erect, 30 to 90 cm. tall, the nodes glabrous or nearly so; blades 12 to 23 cm. long, 15 to 25 mm. wide, the upper scarcely reduced; panicle 8 to 25 cm. long, one-fourth to half as wide, densely flowered; spikelets 1.5 to 1.6 mm. long, minutely puberulent. Autumnal phase remaining erect, producing simple branches from the lower and middle nodes. ♀ —Damp ground, woods, and openings, Connecticut to Oklahoma, south to Georgia and Texas.



FIGURE 984.—*Panicum erectifolium*. Two views of spikelet, and floret, $\times 10$. (Type.)

75. *Panicum erectifolium* Nash. (Fig. 984.) Vernal culms 30 to 70 cm. tall, erect or ascending; sheaths usually crowded at base; ligule very

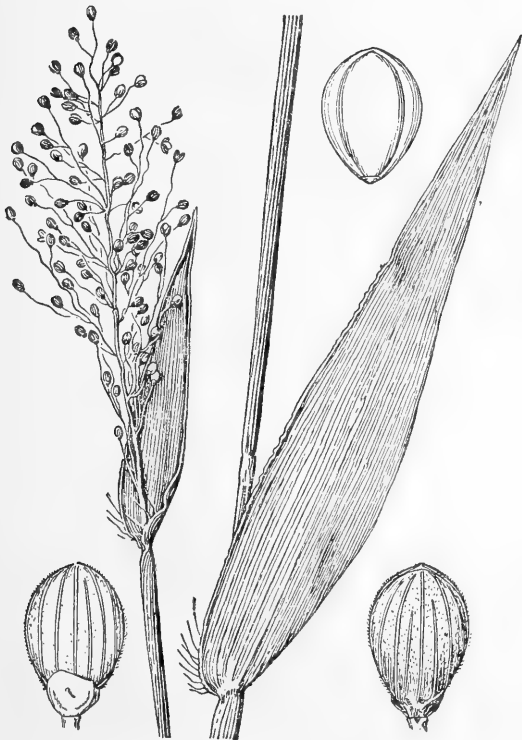


FIGURE 982.—*Panicum sphaerocarpon*. Plant, $\times 1$; two views of spikelet, and floret, $\times 10$. (Deam, Ind.)

short; blades 7 to 13 cm. long, 6 to 12 mm. wide, the crowded lower ones usually much larger than the others; panicle 6 to 12 cm. long, rather narrow, densely flowered, spikelets 1 to 1.2 mm. long, nearly spherical, densely puberulent. Autumnal culms remaining erect, late in the season producing branches from the third or fourth node, the branches nearly as long as the primary culms. 2 — Moist pine barrens, swamps, and borders of ponds, North Carolina to Florida and Louisiana; Cuba.

11. Ensifolia.—Low and slender, mostly glabrous throughout (except in *P. curtifolium* and *P. tenue*); ligules nearly obsolete; spikelets 5- to 7-nerved. Autumnal culms simple to freely branching.

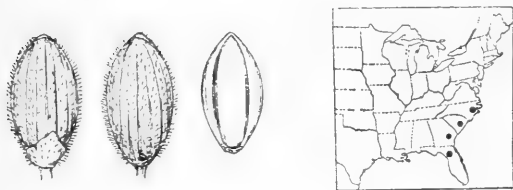


FIGURE 985.—*Panicum tenue*. Two views of spikelet, and floret, $\times 10$. (Type.)

76. Panicum tenue Muhl. (Fig. 985.) Vernal phase olive green; culms 20 to 55 cm. tall, sometimes sparsely appressed-pubescent below; sheaths puberulent between the nerves or sparsely appressed-pilose, or the upper glabrous; blades distant, 2 to 5 cm. long, 3 to 4 mm. wide, rather thick, the margin cartilaginous, puberulent beneath, glabrous on the upper surface; panicle 3 to 5 cm. long; spikelets 1.6 to 1.7 mm. long, puberulent. Autumnal culms erect or leaning, sparingly branching from the middle nodes, the branches in small fascicles. 2 — Moist sandy woods, eastern North Carolina to northern Florida.

77. Panicum albomarginatum Nash. (Fig. 986.) Vernal culms 15 to 40 cm. tall, ascending or spreading; leaves crowded at the base; blades thick and firm, those of the midculm

4 to 6 cm. long, 4 to 6 mm. wide, with a prominent white cartilaginous margin, the uppermost much reduced; panicle 3 to 6 cm. long; spikelet 1.4 to 1.5 mm. long, puberulent. Autumnal culms spreading, branching at the base, forming bushy tufts. 2 — Low sandy soil, Coastal Plain, southeastern Virginia to Florida, Tennessee, Arkansas, and Louisiana; Cuba; Guatemala.

78. Panicum trifolium Nash. (Fig. 987.) Vernal phase similar to that of *P. albomarginatum*, the culms more slender, 20 to 50 cm. tall, the blades less crowded at the base, the upper blade not reduced. Autumnal culms erect or leaning, sparingly branching from the middle and upper nodes. 2 — Low, mostly moist, sandy woods, New Jersey to Florida and Texas; Tennessee.

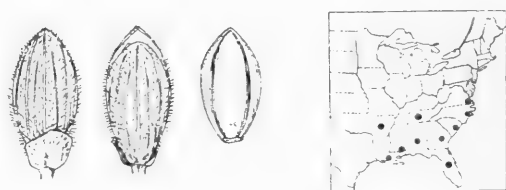


FIGURE 986.—*Panicum albomarginatum*. Two views of spikelet, and floret, $\times 10$. (Type.)

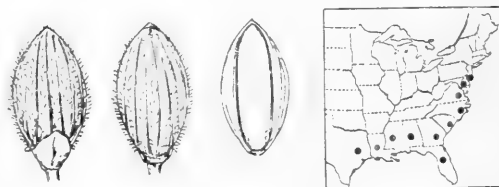


FIGURE 987.—*Panicum trifolium*. Two views of spikelet, and floret, $\times 10$. (Type.)

79. Panicum flavovirens Nash. (Fig. 988.) Vernal phase bright glossy green; culms very slender, ascending or spreading, 15 to 30 cm. tall; blades 2 to 5 cm. long, 3 to 4 mm. wide, thin; panicle few-flowered; spikelets 1.3 to 1.4 mm. long, pubescent. Autumnal culms spreading, decumbent or prostrate, branching from the lower and middle nodes. 2 — Moist, shady, or mucky soil, North Carolina to Florida and Mississippi. *Panicum albomarginatum*, *P. trifolium*, and *P. flavovirens* form a series of closely allied species.

80. *Panicum concinnius* Hitchc. and Chase. (Fig. 989.) Vernal phase bright green; culms very slender, 12 to 50 cm. tall; blades 5 to 7 cm. long, 5 to 6 mm. wide; panicle 3 to 6 cm. long; spikelets 1.1 mm. long, pubescent. Autumnal culms radiate-spreading, late in the season bearing a few branches, with somewhat reduced blades. 2l —Moist sandy ground, northern Georgia, Florida, and northern Alabama, rare.

81. *Panicum ensifolium* Baldw. ex Ell. (Fig. 990.) Vernal culms 20 to 40 cm. tall, erect or reclining; blades distant, often reflexed, 1 to 3 cm. long, 1.5 to 3 mm. wide, puberulent beneath, at least toward the tip; panicle 1.5 to 4 cm. long; spikelets 1.3 to 1.5 mm. long, glabrous or puberulent. Autumnal culms spreading or reclining, sparingly branching

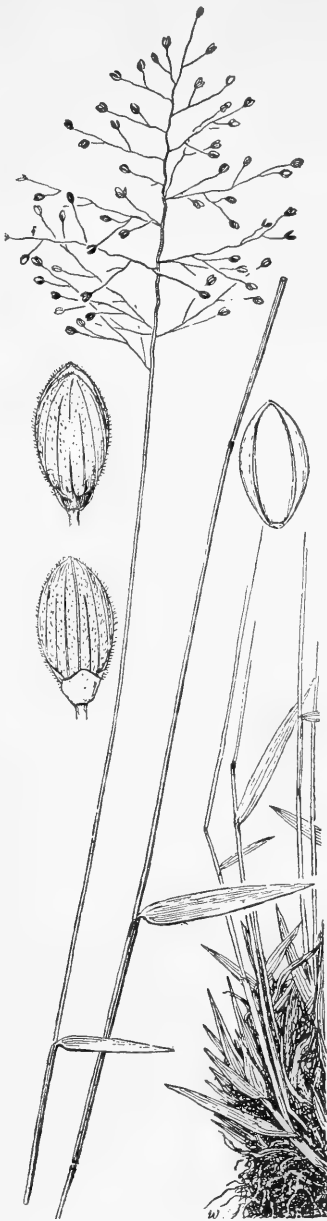


FIGURE 990.—*Panicum ensifolium*. Plant, $\times 1$; two views of spikelet, and floret, $\times 10$. (Biltmore Herb., N. C.)

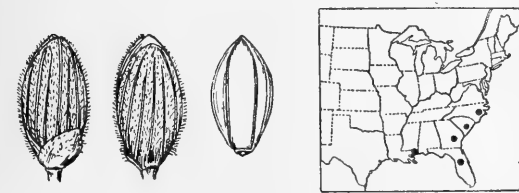


FIGURE 988.—*Panicum flavovirens*. Two views of spikelet, and floret, $\times 10$. (Type.)



FIGURE 989.—*Panicum concinnius*. Two views of spikelet, and floret, $\times 10$. (Type.)

from the middle nodes, the branches mostly simple. 2l —Wet places, mostly sphagnum bogs or swamps, Coastal Plain, New Jersey to Florida and Louisiana.

82. *Panicum vernale* Hitchc. and Chase. (Fig. 991.) Vernal phase light green, soft in texture; culms 15 to 30 cm. tall, very slender, ascending or spreading; leaves clustered at the base; blades thin, 2 to 7 cm. long, 3 to 5 mm. wide, the culm blades smaller; panicle 1.5 to 3 cm. long, few-flowered; spikelets 1.4 to 1.5 mm. long, elliptic, subacute, pubescent.



FIGURE 991.—*Panicum vernale*. Two views of spikelet, and floret, $\times 10$. (Type.)

Autumnal phase like the vernal in appearance, branching from the base, these culms simple and soon dying to the ground, rarely late in the season producing a few short fascicled

branchlets from the nodes, the scarcely reduced flat blades spreading. 2 —Moist places, especially sphagnum bogs, Florida to Mississippi.

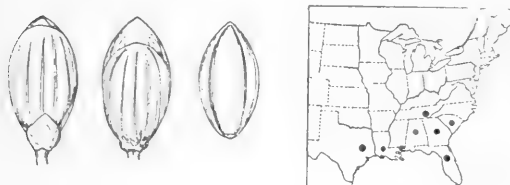


FIGURE 992.—*Panicum curtifolium*. Two views of spikelet, and floret, $\times 10$. (Type.)

83. *Panicum curtifolium* Nash. (Fig. 992.) Vernal culms 10 to 30 cm. tall, slender, weak, angled, erect or spreading, sheaths striate-angled, sparsely pilose; ligule about 1 mm. long; blades spreading or reflexed, 1.5 to 3 cm. long, 2 to 5 mm. wide, thin, soft, sparsely pilose on both surfaces or nearly glabrous above; panicle 2 to 3 cm. long; spikelets 1.4 mm. long, glabrous or minutely pubescent. Autumnal culms weakly spreading, branching from the middle nodes, the ultimate branches in small fascicles toward the summit of the culm. 2 —Boggy soil and shady moist places, sometimes forming a rather dense carpet, South Carolina to Tennessee, south to Florida and Texas.

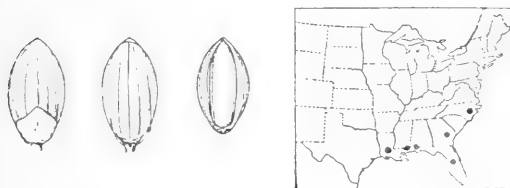


FIGURE 993.—*Panicum chamaelonche*. Two views of spikelet, and floret, $\times 10$. (Type.)

84. *Panicum chamaelonche* Trin. (Fig. 993.) Vernal culms densely tufted, 10 to 20 cm. tall, ascending; blades firm, ascending or spreading, 1.5 to 4 cm. long, 2 to 3 mm. wide; panicle 2.5 to 5 cm. long; spikelets 1.1 to 1.2 mm. long, glabrous. Autumnal culms freely branching from the base and lower nodes, forming dense cushions as much as 50 cm. across. 2 —Open sandy soil in low pineland, North Carolina to Florida and Louisiana; Isla de Pinos.

85. *Panicum glabrifolium* Nash. (Fig. 994.) Vernal phase similar to that of *P. chamaelonche*; culms stouter, 15 to 50 cm. tall, mostly erect; blades erect, 4 to 12 cm. long, 2 to 4 mm. wide, usually involute; panicle 4 to 9 cm. long; spikelets 1.2 to 1.4 mm. long, glabrous. Autumnal culms wiry, elongate, spreading, freely branching from the middle and upper nodes, the blades long and narrow. 2 —Low sandy woods, peninsular Florida. Closely allied to *P. chamaelonche*, but taller and with different autumnal phase.

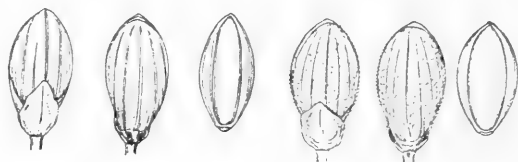


FIGURE 994.—*Panicum glabrifolium*. Two views of spikelet, and floret, $\times 10$. (Type.)

FIGURE 995.—*Panicum breve*. Two views of spikelet, and floret, $\times 10$. (Type.)

86. *Panicum breve* Hitchc. and Chase. (Fig. 995.) Vernal phase purplish; culms 5 to 15 cm. tall, erect, stiff and wiry; sheaths crowded at the base; blades erect, 3 to 6 cm. long, strongly involute, with a few stiff hairs at the base; panicle 1.5 to 4 cm. long; spikelets 1.3 to 1.4 mm. long, puberulent. Autumnal phase erect, branching from the middle nodes, the fascicled branches strict. 2 —Low pine woods and hammocks, east coast of southern Florida.

12. *Lanceária*.—Olive green, often purplish; vernal culms usually wiry; ligules nearly obsolete; blades usually ciliate toward the base; spikelets asymmetrically pyriform, strongly 7- to 9-nerved. Autumnal culms spreading, freely branching.

87. *Panicum portoricense* Desv. ex Hamilt. (Fig. 996.) Vernal culms 15 to 30 cm. tall, slender, crisp-puberulent to nearly glabrous; sheaths glabrous or crisp-puberulent; blades firm, 2 to 5 cm. long, 3 to 6 mm. wide, glabrous to puberulent; panicle 2 to

4 cm. long; spikelets 1.5 to 1.6 mm. long, puberulent. Autumnal culms branching from all but the uppermost node, the reduced blades involute-pointed. ♂ (*P. pauciciliatum* Ashe.)—Sandy woods of the Coastal Plain, mostly in moist places, North Carolina to Florida and Texas; Cuba; Puerto Rico.

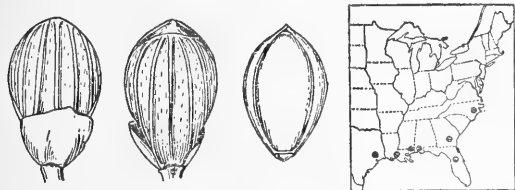


FIGURE 996.—*Panicum portoricense*. Two views of spikelet, and floret, $\times 10$. (Ashe, N. C.)

88. *Panicum lanceárium* Trin. (Fig. 997.) Vernal culms 20 to 50



FIGURE 997.—*Panicum lancearium*. Plant, $\times 1$; two views of spikelet, and floret, $\times 10$. (Chase 4545, S. C.)

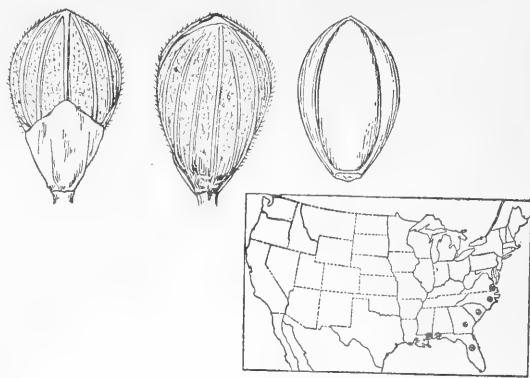


FIGURE 998.—*Panicum patulum*. Two views of spikelet, and floret, $\times 10$. (Type.)

cm. tall, minutely grayish crisp-puberulent; sheaths puberulent; blades firm, 2 to 6 cm. long, 3 to 7 mm. wide, usually glabrous on the upper surface, puberulent or nearly glabrous beneath; panicle 3 to 6 cm. long; spikelets 2 to 2.1 mm. long, glabrous or usually puberulent. Autumnal culms geniculate-spreading, branching from the middle nodes. ♂ —Low sandy woods, Coastal Plain, southeastern Virginia to Florida and Texas; Cuba; Hispaniola; British Honduras.

89. *Panicum pátulum* (Scribn. and Merr.) Hitchc. (Fig. 998.) Vernal phase grayish olive green; culms geniculate-decumbent, as much as 50 cm. long, internodes and sheaths densely velvety-puberulent; blades rather lax, spreading, 4 to 8 cm. long, 4 to 8 mm. wide, velvety-puberulent beneath, pubescent above, ciliate at least half their length; spikelets as in *P. lancearium* but densely pubescent. Autumnal culms more freely branching than in *P. lancearium*, often forming large mats. ♂ —Low moist woods, Coastal Plain, southeastern Virginia to Florida and Louisiana; British Honduras and Hispaniola.

90. *Panicum webberiánum* Nash. (Fig. 999.) Vernal phase usually purplish; culms rather stout, erect or ascending, 20 to 50 cm. tall, minutely puberulent to glabrous; leaves somewhat crowded below; sheaths glabrous or nearly so; blades firm, ascending, often incurved or spoon-

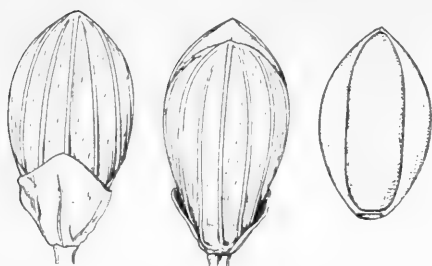


FIGURE 999.—*Panicum webberianum*. Two views of spikelet, and floret, $\times 10$. (Type.)

shaped, 3 to 9 cm. long, 4 to 12 mm. wide, usually ciliate at the subcordate base, glabrous; panicle 4 to 10 cm. long; spikelets 2.3 to 2.5 mm. long, purple-stained at base, glabrous or minutely pubescent. Autumnal culms spreading or decumbent, flabellately branched at the middle and upper nodes. 2 —Low pineland, North Carolina, Georgia, and Florida.

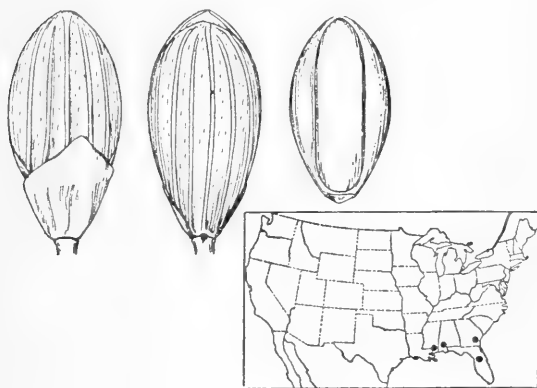


FIGURE 1000.—*Panicum patentifolium*. Two views of spikelet, and floret, $\times 10$. (Type.)

91. *Panicum patentifolium* Nash. (Fig. 1000.) Vernal culms widely decumbent-ascending, slender, 25 to 55 cm. tall, minutely puberulent to nearly glabrous; blades stiffly spreading, 2.5 to 8 cm. long, 2 to 5 mm. wide, glabrous; panicle 3 to 7 cm. long; spikelets 2.4 to 2.6 mm. long, obovate, turgid, puberulent to nearly glabrous. Autumnal phase, decumbent or spreading, branching from the middle and upper nodes, the branches appressed. 2 —Dry sand, especially in "scrub," Georgia and Florida to Mississippi.

13. *Oligosánthia*. — Culms mostly relatively stout, usually erect;

ligules inconspicuous except in *P. ravenelii*; blades firm; spikelets turgid, strongly 7- to 9-nerved. Autumnal culms with branches more or less crowded toward the summit.

92. *Panicum wilcoxianum* Vasey. (Fig. 1001.) Vernal culms 10 to 25 cm. tall, copiously papillose-hirsute, as are sheaths and blades; ligule 1 mm. long; blades firm, erect, 5 to 8

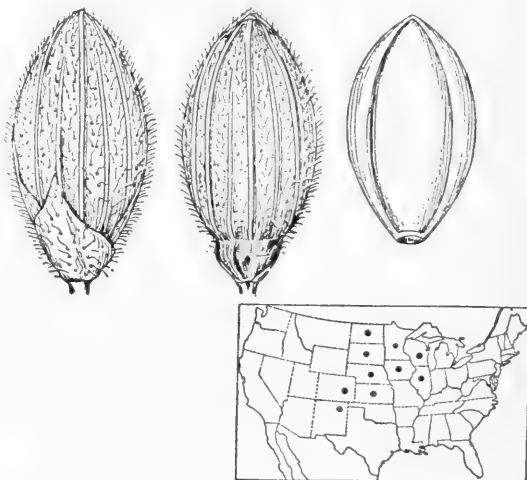


FIGURE 1001.—*Panicum wilcoxianum*. Two views of spikelet, and floret, $\times 10$. (Type.)

cm. long, 3 to 6 mm. wide, usually involute-acuminate; panicle 2 to 5 cm. long; spikelets 2.7 to 3 mm. long, papillose-pubescent. Autumnal culms branching from all the nodes, forming bushy tufts with rigid erect blades. 2 —Prairies, Alberta and Manitoba; Wisconsin and North Dakota to Illinois; Tennessee; Colorado and New Mexico.

93. *Panicum malacophyllum* Nash. (Fig. 1002.) Vernal phase velvety or velvety-pilose throughout; culms slender, 25 to 70 cm. tall, ascending or spreading, the nodes retrorsely bearded; ligule 1 to 1.5 mm. long; blades 7 to 10 cm. long, 6 to 12 mm. wide; panicle 3 to 7 cm. long; spikelets 2.9 to 3 mm. long, papillose-pilose. Autumnal phase spreading, forming bushy topheavy clumps with reduced blades. 2 —Sandy woods, Tennessee to Kansas and Texas.

94. *Panicum helléri* Nash. (Fig. 1003.) Vernal culms 25 to 60 cm.

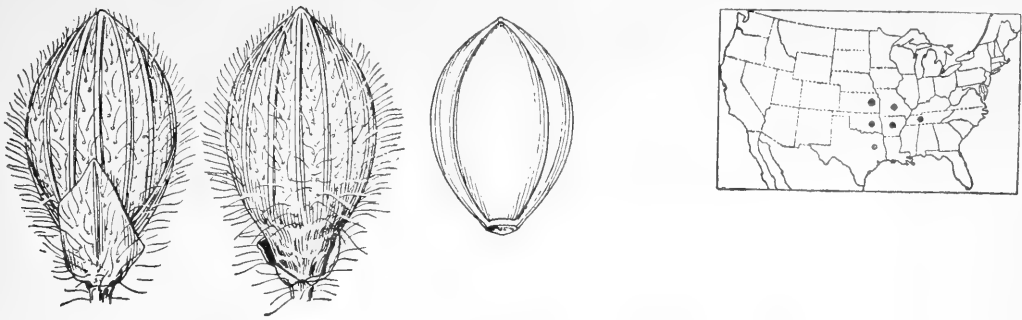


FIGURE 1002.—*Panicum malacophyllum*. Two views of spikelet, and floret, $\times 10$. (Type.)

tall, ascending or spreading, appressed-pilose below, often glabrous above; sheaths sparsely papillose-hispid to glabrous; blades rather thin, glabrous on both surfaces or pubescent beneath, ciliate toward the base; panicle 6 to 12 cm. long; spikelets 2.9 to 3 mm. long, glabrous or with a few scattered hairs. Autumnal phase branching at all but the lowest nodes, forming loose sprawling tufts, the blades widely spreading, not much reduced, the long-pediceled spikelets rather conspicuous among the foliage. 2 —Open woods and prairies, Missouri and Oklahoma to

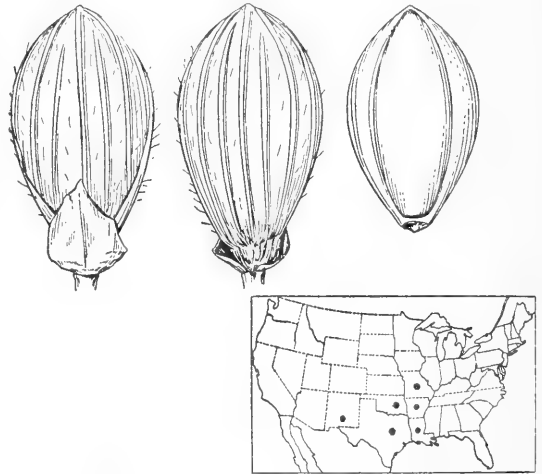


FIGURE 1003.—*Panicum helleri*. Two views of spikelet, and floret, $\times 10$. (Type.)

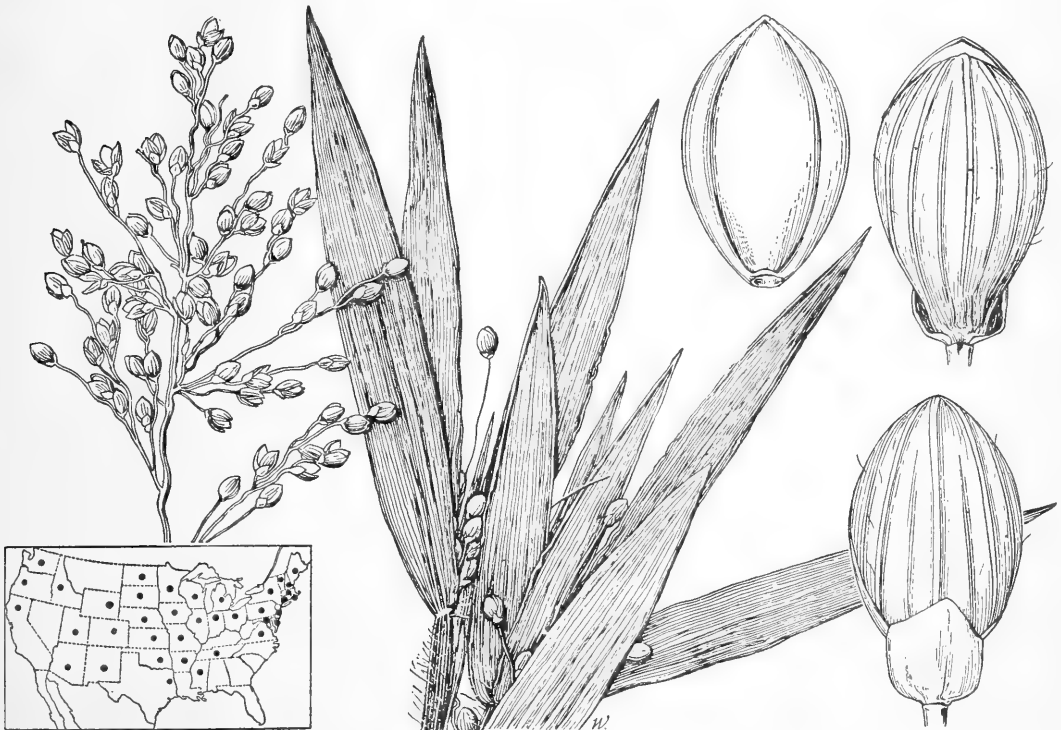


FIGURE 1004.—*Panicum scribnerianum*. Plant, $\times 1$; two views of spikelet, and floret, $\times 10$. (Vernal phase, McDonald 32, Ill.; autumnal phase, Umbach 2365, Ill.)

Louisiana and New Mexico. Closely related to *P. scribnerianum*.

95. *Panicum scribnerianum* Nash. (Fig. 1004.) Vernal culms 20 to 50 cm. tall, glabrous or harshly puberulent or sometimes ascending-pilose; sheaths striate, papillose-hispid to nearly glabrous; blades ascending or erect, 5 to 10 cm. long, 6 to 12 mm. wide, firm, rounded at the ciliate base, glabrous on the upper surface, appressed-pubescent

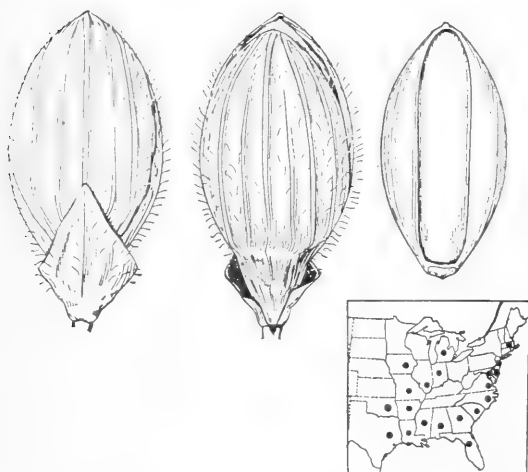


FIGURE 1005.—*Panicum oligosanthos*. Two views of spikelet, and floret, $\times 10$. (Type.)

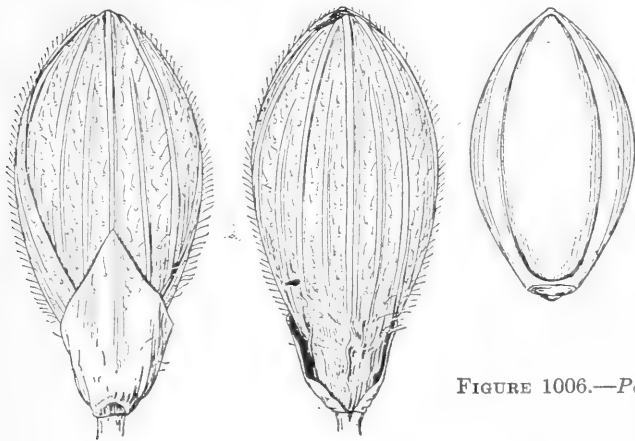


FIGURE 1006.—*Panicum ravenelii*. Two views of spikelet, and floret, $\times 10$. (Type.)

to glabrous beneath; panicle 4 to 8 cm. long; spikelets 3.2 to 3.3 mm. long, obovate, blunt, sparsely pubescent to nearly glabrous. Autumnal phase branching from the middle and upper nodes. 21 —Sandy soil or dry prairies, Maine to British Columbia and Washington, south to Virginia, Mississippi, Texas, and Arizona; Mexico.

96. *Panicum oligosanthos* Schult. (Fig. 1005.) Vernal culms 35 to 80 cm. tall, appressed-pubescent, especially below; sheaths with ascending papillose pubescence; blades stiffly spreading or ascending, 6 to 14 cm. long, 5 to 8 mm. wide, glabrous or nearly so on the upper surface, harshly puberulent beneath; panicle 6 to 12 cm. long; spikelets long-pedicel, 3.5 to 4 mm. long, subacute, sparsely hirsute. Autumnal phase erect to spreading, branching freely from the upper nodes. 21 —Sandy, usually moist woods, Massachusetts and Michigan to Iowa, south to Florida and Texas.

97. *Panicum ravenelii* Scribn. and Merr. (Fig. 1006.) Vernal culms 30 to 70 cm. tall, densely papillose-hirsute with ascending hairs, the nodes short-bearded; sheaths hirsute like the culm; ligule 3 to 4 mm. long; blades thick, 8 to 15 cm. long, 1 to 2 cm. wide, glabrous on the upper surface, densely velvety-hirsute beneath; panicle 7 to 12 cm. long; spikelets 4 to 4.3 mm. long, sparsely papillose-pubescent. Autumnal phase

more or less spreading, branching from the middle and upper nodes, the short branches crowded at the summit. 21 —Sandy or gravelly woods or open ground, Delaware to Missouri, south to Florida and Texas.

98. *Panicum leibergii* (Vasey) Scribn. (Fig. 1007.) Vernal culms slender, 25 to 75 cm. tall, erect from a more or less geniculate base, pilose

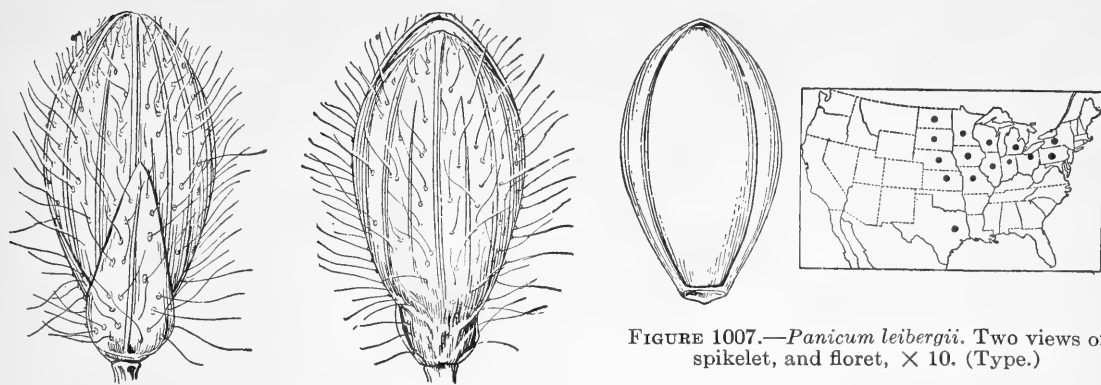


FIGURE 1007.—*Panicum leibergii*. Two views of spikelet, and floret, $\times 10$. (Type.)

or scabrous; sheaths papillose-hispid with spreading hairs; ligule obsolete or nearly so; blades ascending or erect, rather thin, 6 to 15 cm. long, 7 to 15 mm. wide, papillose-hispid on both surfaces, often sparsely so above; panicle 8 to 15 cm. long, less than half as wide; spikelets 3.7 to 4 mm. long, strongly papillose-hispid. Autumnal phase leaning, sparingly branching from the middle and lower nodes. ♀ —Prairies, New York and Pennsylvania to Manitoba and North Dakota, south to Ohio and Kansas; Texas.

99. *Panicum xanthophyllum* A. Gray. (Fig. 1008.) Vernal phase yellowish green; culms 20 to 55 cm. tall, more or less scabrous; sheaths sparsely papillose-pilose; blades erect or nearly so, rather thin, prominently nerved, 10 to 15 cm. long, 1 to 2 cm. wide, glabrous except the ciliate base; panicle 5 to 12 cm. long, very narrow, few-flowered, the stiff branches erect or nearly so; spikelets 3.7 to 4 mm. long, blunt, pubescent. Autumnal

phase erect or ascending, branching from the second and third nodes, the branches erect, mostly simple. ♀ —Sandy or gravelly soil, Quebec to Manitoba, south to Pennsylvania, West Virginia, and Minnesota.

14. *Pedicellata*.—Culms slender from a knotted crown; sheaths papillose-hirsute; ligules about 1 mm. long; blades long-ciliate at least toward base; spikelets attenuate at base, 7- to 9-nerved, papillose-pubescent. Autumnal culms freely branching, the branches appearing before the maturity of the primary panicle; no distinct winter rosette formed.

100. *Panicum pedicellatum* Vasey. (Fig. 1009.) Vernal culms erect or ascending, 20 to 50 cm. tall, usually ascending-hirsute, at least below; blades 5 to 9 cm. long, 3 to 6 mm. wide, glabrous or sometimes minutely hispid; panicle 3 to 6 cm. long; spikelets 3.5 to 3.7 mm. long, elliptic; first glume about half as long as the spikelet, acute, the

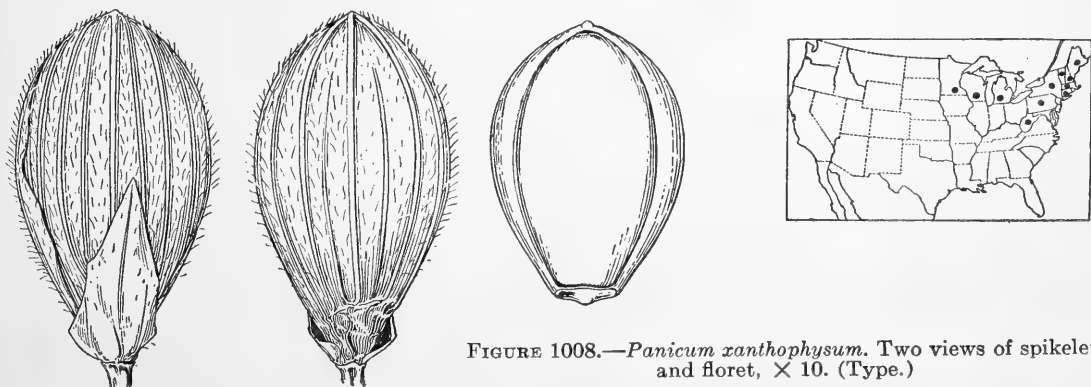


FIGURE 1008.—*Panicum xanthophyllum*. Two views of spikelet, and floret, $\times 10$. (Type.)

second shorter than the fruit. Autumnal culms erect or leaning, branching from all but the uppermost nodes, the branches spreading. ♀ —Dry woods and prairies, central and southern Texas.

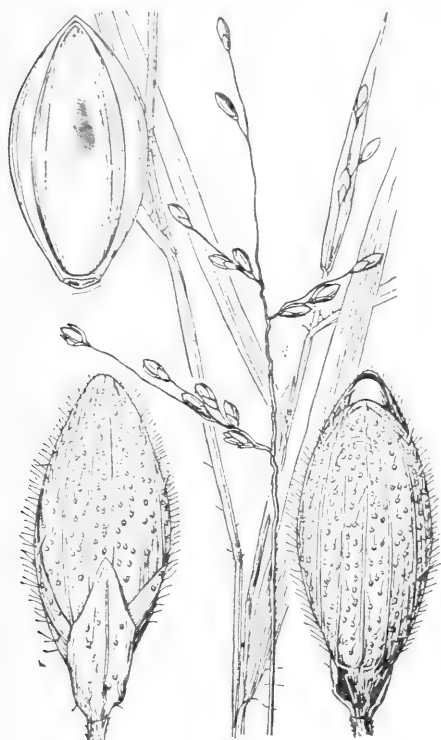


FIGURE 1009.—*Panicum pedicellatum*. Plant, $\times 1$; two views of spikelet, and floret, $\times 10$. (Heller, Tex.)



FIGURE 1010.—*Panicum nodatum*. Two views of spikelet, and floret, $\times 10$. (Type.)

101. *Panicum nodatum* Hitchc. and Chase. (Fig. 1010.) Vernal culms tufted, ascending or spreading, hard and wiry, 25 to 35 cm. tall, finely papillose, crisp-puberulent; blades firm, ascending, 3 to 5 cm. long, 3 to 6 mm. wide, puberulent on both surfaces; panicle 4 to 5 cm. long, few-flowered; spikelets 4 mm. long, pyriform. Autumnal culms widely geniculate-decumbent, branching from all but the uppermost node, the branches somewhat divaricate, the nodes of the main culm swollen. ♀ —Oak woods in sand dunes, southern Texas and northern Mexico.

15. *Scopária*.—Species of various habit, vernal culms tall; ligules 1 mm. long or less; blades elongate; spikelets abruptly pointed, 7- to 9-nerved; autumnal culms branching from the middle or upper nodes.

102. *Panicum scoparium* Lam. (Fig. 1011.) Vernal phase grayish olive green, velvety-pubescent throughout except on a viscid ring below the nodes and at the summit of the sheath; culms 80 to 130 cm. tall, stout, erect or ascending, usually geniculate at base; blades rather thick, 12 to 20 cm. long, 10 to 18 mm. wide; panicle 8 to 15 cm. long, the axis and branches with viscid blotches; spikelets 2.4 to 2.6 mm. long, obovate, turgid, papillose-pubescent. Autumnal phase leaning or spreading, freely branching from the middle nodes, forming flabellate fascicles. ♀ —Wet or damp soil, Massachusetts to Florida, west through Kentucky to Missouri, Oklahoma, and Texas; Cuba.

103. *Panicum aculeatum* Hitchc. and Chase. (Fig. 1012.) Vernal culms in large clumps, slender, 70 to 100 cm. tall, ascending, scabrous, harshly pubescent below; sheaths papillose-hispid with stiff sharp-pointed hairs, a puberulent ring at the summit, the uppermost usually glabrous; blades firm, stiffly ascending or spreading, 12 to 20 cm. long, 9 to 13 mm. wide,



FIGURE 1011.—*Panicum scoparium*. Plant, $\times 1$; two views of spikelet, and floret, $\times 10$. (McGregor 212, S. C.)

scabrous on the upper surface and toward the apex beneath; panicle 8 to 12 cm. long, few-flowered; spikelets 3 mm. long, elliptic, minutely pubescent, pointed beyond the fruit. Autumnal culms branching from the middle nodes, the branches more or less divaricate, the ultimate panicles wholly or partly included in the sheaths. 2 —Swampy woods, Connecticut to North Carolina, rare.

104. *Panicum recognitum* Fernald. (Fig. 1013.) Culms 60 to 150 cm. tall, with elongate internodes, glabrous; sheaths much shorter than the internodes, papillose-pilose to glabrate; ligule minute; blades 6 to 13 cm. long, 8 to 15 mm. wide, lanceolate, acuminate, glabrous, or sometimes pilose on the lower surface, the margins ciliate toward the cordate base, pubescent on the collar; primary panicle 8 to 13 cm. long, the branches broadly ascending, few-flowered; pulvini pubescent; spikelets 2.2 to 2.8 mm. long, elliptic, rather sparsely pubescent; first glume 0.8 to 1 mm. long, ovate, acute, the second glume and sterile lemma subequal, scarcely



FIGURE 1012.—*Panicum aculeatum*. Two views of spikelet, and floret, $\times 10$. (Type.)

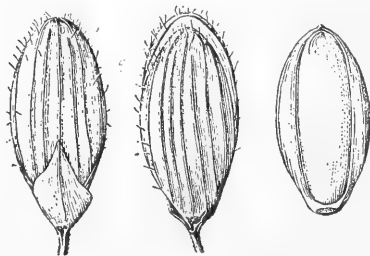


FIGURE 1013.—*Panicum recognitum*. Two views of spikelet, and floret, $\times 10$. (Long 7672, N. J.)

covering the fruit. Autumnal phase sparingly branched, the branches elongate, ascending, the panicles 1.5 to 5 cm. long. ♀ —Open sandy ground, swamps, and moist places, Rhode Island, New Jersey, and eastern Pennsylvania.



FIGURE 1014.—*Panicum mundum*. Two views of spikelet, and floret, $\times 10$. (Fernald and Long 6017, Va.)

105. *Panicum mündum* Fernald. (Fig. 1014.) Culms 50 to 140 cm. tall, densely tufted, pilose or papillose-pilose with ascending hairs, the nodes retrorsely bearded, with a glabrous glandular ring below; sheaths much shorter than the internodes, viscid-spotted, ascending-pilose or glabrate; ligule about 1 mm. long; blades 6 to 15 cm. long, 8 to 13 mm. wide, lanceolate, subcordate, papillose-ciliate toward the base; primary panicle 7 to 12 cm. long, 5 to 10 cm. wide, the branches ascending; spikelets 1.8 to 2.2 mm. long, subglobose or ellipsoid, densely pubescent, first glume about one-fourth the length of the spikelet, subacute. Autumnal phase sparingly branched, the panicles 1 to 6 cm. long. ♀ — Borders of swamps and sandy, peaty meadows, southeastern Virginia (Princess Anne and Sussex Counties) and Durham County, N. C.

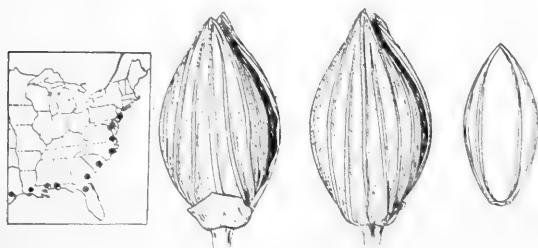


FIGURE 1015.—*Panicum scabriusculum*. Two views of spikelet, and floret, $\times 10$. (Type.)

106. *Panicum scabriusculum* Ell. (Fig. 1015.) Vernal phase grayish olive green; culms erect, 1 to 1.5 m. tall, scabrous at least below the nodes, sometimes puberulent; sheaths glabrous or more or less hispid at least toward the summit, often mottled or white-spotted, commonly swollen at the base and contracted toward the summit; blades stiffly ascending or spreading, often reflexed, 15 to 25 cm. long, 9 to 12 mm. wide, glabrous or scabrous, often more or less pubescent beneath, tapering to an involute point; panicle 10 to 20 cm. long; spikelets 2.3 to 2.6 mm. long, ovate, glabrous or obscurely puberulent. Autumnal culms erect, branching from the middle and upper nodes, the branches appressed, finally forming dense oblong masses along the upper part of the primary culm, the panicles partly or entirely enclosed in the sheaths. ♀ —Moist ground, especially along ditches, streams, and swamps, Coastal Plain, New Jersey to Florida and Texas.

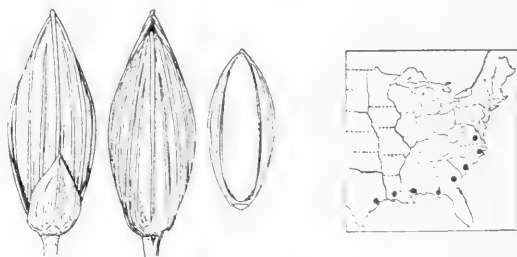


FIGURE 1016.—*Panicum cryptanthum*. Two views of spikelet, and floret, $\times 10$. (Type.)

107. *Panicum cryptanthum* Ashe. (Fig. 1016.) Vernal culms erect, 80 to 100 cm. tall, glabrous except the usually bearded nodes; sheaths glabrous or the lowermost sparsely hirsute, the upper somewhat inflated; blades stiff, glabrous, sparingly ciliate at base, 10 to 15 cm. long, 7 to 9 mm. wide; panicle 6 to 10 cm. long, the axis and ascending branches viscid-spotted; spikelets 2.2 to 2.4 mm. long, lanceolate-elliptic, pointed. Autumnal culms erect, sparingly branching from the middle nodes, the panicles partly hidden in the sheaths. ♀ —Low

swampy ground, Virginia to Florida and Texas; infrequent.

16. *Commūtāta*.—Culms relatively stout, glabrous or puberulent; ligules obsolete or nearly so; blades cordate and more or less ciliate at base; spikelets elliptic, not very turgid, 7- to 9-nerved, pubescent. Autumnal culms usually rather sparingly branching.

108. *Panicum áshei* Pearson. (Fig. 1017.) Vernal phase usually purplish, from a knotted crown; culms 25 to 50 cm. tall, erect, stiff and wiry, densely crisp-puberulent; sheaths less densely puberulent; blades rather thick and firm, 4 to 8 cm. long, 5 to 10 mm. wide, glabrous; panicle 5 to 8 cm. long, loosely flowered; spikelets 2.4 to 2.7 mm. long. Autumnal culms erect or topheavy-reclining, bearing divergent branches from the middle and upper nodes or from the upper nodes only. 2 —Dry, especially rocky

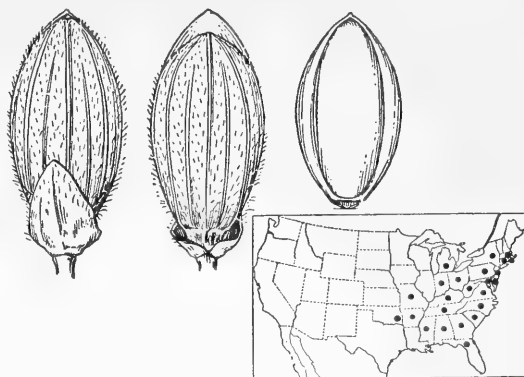


FIGURE 1017.—*Panicum ashei*. Two views of spikelet, and floret, $\times 10$. (Type coll.)

woods, Massachusetts to Michigan and Missouri, south to northern Florida, Mississippi, Arkansas, and Oklahoma.

109. *Panicum commutatum* Schult. (Fig. 1018.) Vernal culms 40 to 75 cm. tall, erect; sheaths glabrous or nearly so; blades 5 to 12 cm. long, 12 to 25 mm. wide, glabrous on both surfaces or puberulent beneath; pan-



FIGURE 1018.—*Panicum commutatum*. Plant, $\times 1$; two views of spikelet, and floret, $\times 10$. (Bock and Chase 118, Ill.)

icle 6 to 12 cm. long; spikelets 2.6 to 2.8 mm. long. Autumnal culms erect or leaning, branching from the middle nodes, the secondary branches crowded toward the summit. 2

culms widely spreading, bearing more or less divaricate branches from all the nodes, the ultimate branches in short dense fascicles. 2 —Low or swampy woods, Coastal Plain, south-

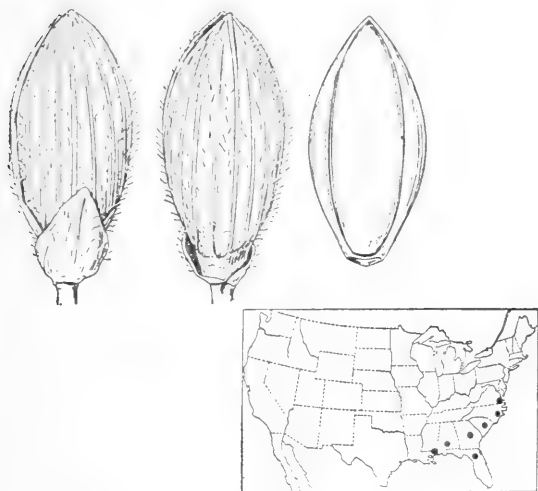


FIGURE 1019.—*Panicum mutabile*. Two views of spikelet, and floret, $\times 10$. (Type.)

—Woods and copses, Massachusetts to Michigan and Oklahoma, south to Florida and Texas.

110. *Panicum mutabile* Scribn. and Smith ex Nash. (Fig. 1019.) Vernal phase blue green, glaucous; culms solitary or few in a tuft, erect, 30 to 70 cm. tall; sheaths glabrous; blades horizontally spreading, 6 to 15 cm. long, 8 to 20 mm. wide, tapering to both ends, glabrous, ciliate toward the cordate base or the lower ciliate nearly to apex; panicle 7 to 15 cm. long; spikelets 2.9 to 3 mm. long. Autumnal culms erect or reclining, sparingly branched from the middle and upper nodes. 2 —Sandy pine woods or hammocks, Coastal Plain, southeastern Virginia to Florida and Mississippi.

111. *Panicum joorii* Vasey. (Fig. 1020.) Vernal culms 20 to 55 cm. tall, slender, spreading or ascending from a decumbent base, at least the lower internodes purplish red; sheaths glabrous; blades 6 to 15 cm. long, 7 to 18 mm. wide, thin, often subfalcate, glabrous on both surfaces; panicle loosely flowered, 5 to 9 cm. long; spikelets 3 to 3.1 mm. long. Autumnal

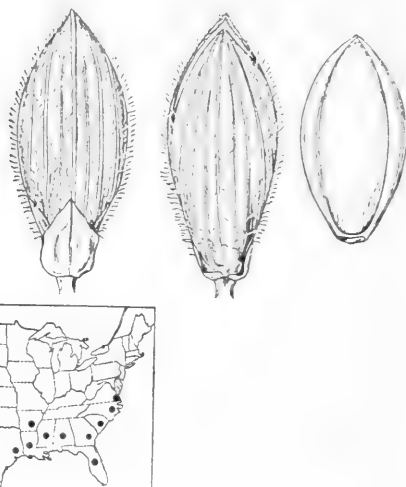


FIGURE 1020.—*Panicum joorii*. Two views of spikelet, and floret, $\times 10$. (Type.)

eastern Virginia to Florida, west to Arkansas and Texas; Mexico.

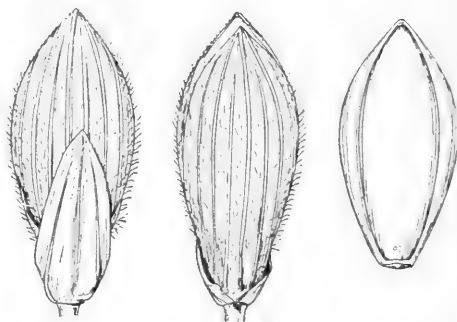


FIGURE 1021.—*Panicum equilaterale*. Two views of spikelet, and floret, $\times 10$. (Type.)

112. *Panicum equilaterale* Scribn. (Fig. 1021.) Vernal culms 25 to 70 cm. tall, stiff and erect; sheaths glabrous, the upper two often approximate; blades firm, widely spreading, 6 to 17 cm. long, 6 to 14 mm. wide, the margins nearly parallel, glabrous, often ciliate at the rounded or subcordate base; panicle 5 to 10 cm. long; spikelets 3.2 mm. long. Autumnal culms erect or leaning, branching from the upper and middle nodes. 2 —Pinelands, hammocks, and sandy woods, Coastal Plain, North

Carolina, South Carolina, and Florida.

17. *Latifolia*.—Culms rather stout, erect or suberect; ligules not more than 1 mm. long; blades cordate, clasping; spikelets rather turgid, 7- to 9-nerved, pubescent. Autumnal phase usually rather sparingly branching.

113. *Panicum clandestinum* L. (Fig. 1022.) Vernal culms in large dense clumps, sometimes with strong rhizomes 5 to 10 cm. long, 70 to 150 cm. tall, scabrous to papillose-hispid,

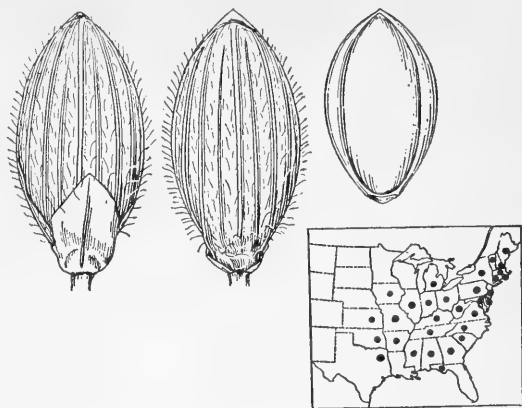


FIGURE 1022.—*Panicum clandestinum*. Two views of spikelet, and floret, $\times 10$. (Torrey, N. Y.)



FIGURE 1023.—*Panicum latifolium*. Plant, $\times 1$; two views of spikelet, and floret, $\times 10$. (Schenck, Ill.)

at least below the nodes; sheaths strongly papillose-hispid to nearly glabrous; blades spreading or finally reflexed, 10 to 20 cm. long, 1.2 to 3 cm. wide, scabrous on both surfaces, at least toward the end, usually ciliate at base; panicle 8 to 15 cm. long; spikelets 2.7 to 3 mm. long. Autumnal culms erect or leaning, the branches leafy, the swollen bristly sheaths overlapping and wholly or partly enclosing the panicles. 2l —Moist mostly sandy ground, Nova Scotia, Quebec, and Maine to Kansas, south to northern Florida and Texas.

114. *Panicum latifolium* L. (Fig. 1023.) Vernal culms from a knotted crown; culms 45 to 100 cm. tall, glabrous or the lower part sparsely pu-

bescent; sheaths ciliate; blades 8 to 18 cm. long, 1.5 to 4 cm. wide, glabrous; panicle 7 to 15 cm. long; spikelets 3.4 to 3.7 mm. long. Autumnal culms more or less spreading, branching from the middle nodes, the upper leaves of the branches crowded and spreading, not much reduced. 2l —Rocky or sandy woods, Maine and Quebec to Minnesota, south to Georgia, Kansas and Arkansas.

115. *Panicum boscii* Poir. (Fig. 1024.) Vernal phase resembling that of *P. latifolium*; culms 40 to 70 cm. tall, glabrous or minutely puberulent, the nodes retrorsely bearded; sheaths glabrous or nearly so; blades spreading, 7 to 12 cm. long, 1.5 to 3 cm. wide, sparsely ciliate at base, gla-

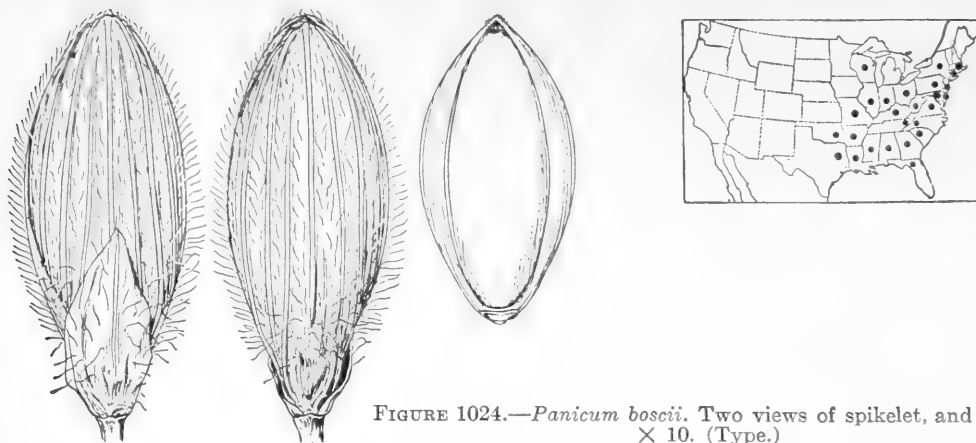


FIGURE 1024.—*Panicum boscii*. Two views of spikelet, and floret, $\times 10$. (Type.)

brous or nearly so; panicle 6 to 12 cm. long; spikelets 4 to 4.5 mm. long, about half as wide, papillose-pubescent. Autumnal phase about as in *P. latifolium*, finally top-heavy-reclining. ♀ — Woods, Massachusetts to Wisconsin and Oklahoma, south to northern Florida and Texas. *PANICUM BOSCHII* var. *MÖLLE* (Vasey) Hitchc. and Chase. Differing from *P. boscii* in the downy-villous culms and sheaths and the velvety blades. ♀ — About the same range as the species.

SUBGENUS 3. *EUPANICUM* Godr.

Spikelets in open or condensed panicles or in spikelike racemes, the branchlets not produced as bristles (the naked tip forming a short point in *Geminata*); not presenting vernal and autumnal phases of a distinctive character, with winter rosettes of leaves different from the culm leaves.

1. ***Geminata***.—Subaquatic glabrous perennials; inflorescence of several erect, spikelike racemes distant on an elongate axis; rachis ending in a short naked point; spikelets subsessile, abruptly pointed, glabrous, first glume truncate; fruit transversely rugose.

116. ***Panicum geminatum*** Forsk. (Fig. 1025.) Culms tufted, 25 to 80 cm. tall, scarcely succulent, often decumbent at base or with stolons rooting at the nodes; blades 10 to 20 cm. long, 3 to 6 mm. wide, flat, or in-

volute toward the apex; panicle 12 to 30 cm. long, the appressed racemes 12 to 18, the lower 2.5 to 3 cm. long, the upper gradually shorter; spikelets 2.2 to 2.4 mm. long, 5-nerved. ♀ — Moist ground or shallow water, mostly near the coast, southern Florida, Louisiana, Texas, and Oklahoma; warmer regions of both hemispheres.

117. ***Panicum paludivagum*** Hitchc. and Chase. (Fig. 1026.) Resembling *P. geminatum*, but the culms elongate from a long creeping rooting base, rather succulent, as much as 2 m. long, the lower part submerged, loosely branching; blades 15 to 40 cm. long, scabrous on the upper surface; spikelets 2.8 to 3 mm. long, faintly 3-nerved; fruit obscurely rugose. ♀ — More or less submerged in fresh-water rivers and lakes, Florida, Texas; Mexico, Guatemala.

2. ***Purpurascéntia***.—Stoloniferous robust perennial; a single species introduced.

118. ***Panicum purpurascens*** Raddi. *PARA GRASS*. (Fig. 1027.) Culms decumbent and rooting at base, 2 to 5 m. long, the nodes densely villous; sheaths villous or the upper glabrous, densely pubescent on the collar; blades 10 to 30 cm. long, 10 to 15 mm. wide, flat, glabrous; panicle 12 to 20 cm. long, the rather distant subracemose densely flowered branches ascending or spreading; spikelets subsessile, 3 mm. long, elliptic, 5-nerved, glabrous; fruit minutely transversely



FIGURE 1025.—*Panicum geminatum*. Plant, $\times \frac{1}{2}$; two views of spikelet, and floret, $\times 10$. (Tracy 9395, Fla.)

rugose. 21 (*P. barbinode* Trin.)—
Cultivated and waste ground in moist

soil, borders of rivers, marshes, and
swamps, Florida, Alabama (Mobile),

Texas; Oregon (Linnton); throughout tropical America at low altitudes. Commonly cultivated in tropical America as a forage grass, being cut for green feed. It probably was introduced into Brazil at an early date from Africa.

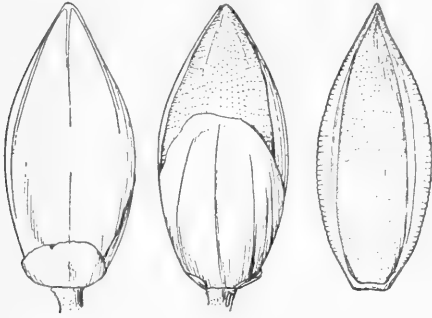


FIGURE 1026.—*Panicum paludivagum*. Two views of spikelet, and floret, $\times 10$. (Type.)

3. Fasciculáta.—Branching annuals; blades flat; ligules not more than 1 mm. long; panicles of ascending spikelike racemes along an angled axis; spikelets subsessile, abruptly pointed, strongly 5- to 7-nerved; fruit transversely rugose.

119. *Panicum réptans* L. (Fig. 1028.) Culms ascending 10 to 30 cm. above the creeping base; blades 1.5 to 6 cm. long, 4 to 12 mm. wide, cordate, usually glabrous, ciliate on the undulate margin at base; panicle 2 to 6 cm. long, the 3 to 12 ascending or spreading racemes 2 to 3 cm. long, aggregate, the rachis usually pilose with long weak hairs; spikelets secund, about 2 mm. long, glabrous, on pubescent or pilose pedicels about 1 mm.; first glume very short, truncate or rounded. ☉ —Moist open ground, or a weed in cultivated fields; Florida to Texas; tropical regions of both hemispheres.

120. *Panicum fasciculátum* Swartz. BROWNTOP PANICUM. (Fig. 1029.) Culms erect or spreading from a decumbent base, 30 to 100 cm. tall, sometimes pubescent below the panicle or hispid below the appressed-pubescent nodes, the more robust freely branched from the lower nodes; sheaths glabrous to papillose-hispid;

blades 4 to 30 cm. long, 6 to 20 mm. wide, glabrous; panicle 5 to 15 cm. long; the racemes 5 to 10 cm. long; spikelets yellow or bronze brown, 2.1 to 2.5 mm. long, rarely 3 mm., obovate, turgid, glabrous, strongly transversely wrinkled or veined. ☉ —Moist open ground, often a weed in fields, southern Florida, southern Texas; tropical America, at low altitudes.

***PANICUM FASCICULATUM* var. *RETICULÁTUM* (Torr.) Beal.** Differing from *P. fasciculatum* in having smaller more compact panicles, narrower pubescent blades, less regular suberect racemes and larger, mostly more yellowish spikelets 2.6 to 3 mm. long. Many intergrades occur. ☉ (This has been erroneously referred to *P. fasciculatum* var. *chartaginense* (Swartz) Doell.)—Prairies, fields, and waste ground; New Mexico and Arizona; Mexico.

121. *Panicum adspérsus* Trin. (Fig. 1030.) Culms ascending or spreading from a decumbent base, rooting at the lower nodes, 30 to 100 cm. tall; blades 5 to 15 cm. long, 8 to 20 mm. wide; panicle 6 to 15 cm. long, the racemes 3 to 10 cm. long; spikelets 3.2 to 4 mm. long, fusiform, abruptly acuminate, hispid or hispidulous, sometimes only at the summit, rarely glabrous, obscurely reticulate-veined. ☉ —Moist open ground, often on coral limestone, Florida; ballast, Philadelphia and Camden; Mobile; West Indies. The Florida specimens, commonly more robust than the typical form from the West Indies, have been described as *P. keyense* Mez.

122. *Panicum ramósum* L. BROWNTOP MILLET. (Fig. 1031.) Resembling *P. fasciculatum* var. *reticulatum*; pedicels bristly; spikelets glabrous to finely pubescent, about 3 mm. long, tawny or dull brown. ☉ —Waste ground, North Carolina to Florida, Arkansas, and Louisiana; tropical Asia. Cultivated for bird food.

123. *Panicum arizónicum* Scribn. and Merr. ARIZONA PANICUM. (Fig.



FIGURE 1027.—*Panicum purpurascens*. Plant, $\times \frac{1}{2}$; two views of spikelet, and floret, $\times 10$. (Hitchcock 9693, Jamaica.)

1032.) Culms erect or sometimes decumbent at base, 20 to 60 cm. tall; sheaths glabrous to papillose-hispid; blades 5 to 15 cm. long, 6 to 12 mm.

wide, glabrous or papillose-hispid beneath, ciliate near base; panicle 7 to 20 cm. long, the branches rather loosely flowered, finely pubescent

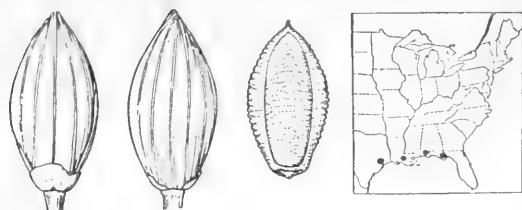


FIGURE 1028.—*Panicum reptans*. Two views of spikelet, and floret, $\times 10$. (Type of *P. prostratum* Lam.)

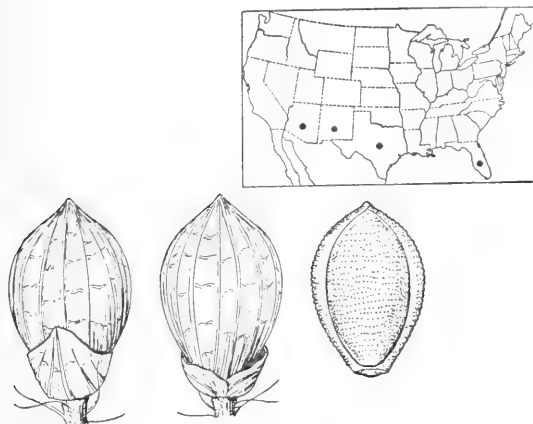


FIGURE 1029.—*Panicum fasciculatum*. Two views of spikelet, and floret, $\times 10$. (Type.)

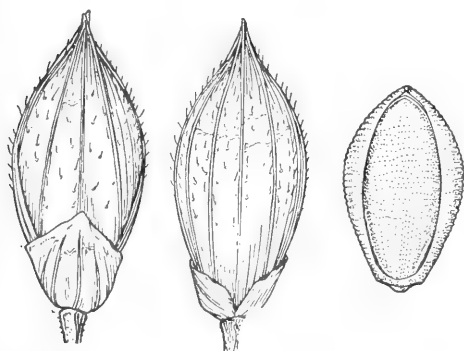


FIGURE 1030.—*Panicum adspersum*. Two views of spikelet, and floret, $\times 10$. (Type.)

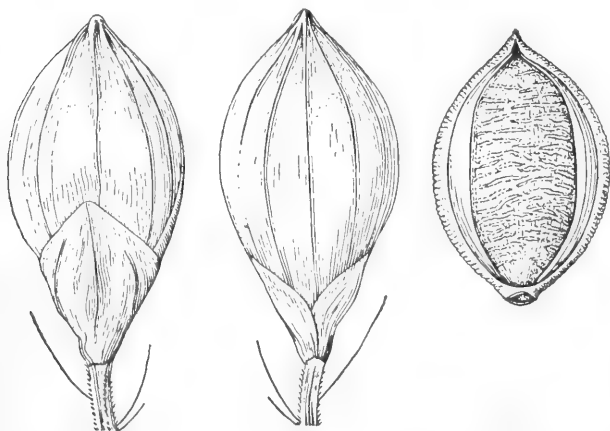


FIGURE 1031.—*Panicum ramosum*. Two views of spikelet, and floret, $\times 10$. (Handley A-75, Fla.)

and papillose-hirsute; spikelets 3.5 to 3.8 mm. long, obovate-elliptic, densely hirsute to glabrous. ☉ — Open sandy or stony ground, or in cultivated soil, western Texas to southern California; Mexico.

124. *Panicum texanum* Buckl.

TEXAS MILLET. (Fig. 1033.) Culms erect or ascending, often decumbent and rooting at the lower nodes, 50 to 150 cm. or even to 3 m. long, softly pubescent, at least below the nodes and below the panicles; sheaths softly pubescent, often papillose; blades 8 to 20 cm. long, 7 to 15 mm. wide, softly pubescent; panicle 8 to 20 cm. long, the branches short, appressed, loosely flowered, the axis and rachises pubescent, with long hairs intermixed; spikelets 5 to 6 mm. long, fusiform, pilose, often obscurely reticulate. ☉ — Prairies and open ground, especially on low land along streams, often a weed in fields, Texas; introduced at several localities, North Carolina to Florida and Oklahoma; Arizona; northern Mexico.

4. *Dichotomiflora*.—Somewhat succulent branching annuals (a few species perennial); blades flat, panicles many-flowered, the branchlets short and appressed along the rather stiff main branches; spikelets short-pedicelled, 7-nerved, glabrous; first glume short, broad; fruit smooth and shining.

125. *Panicum dichotomiflorum*

Michx. FALL PANICUM. (Fig. 1034.) Culms ascending or spreading from a geniculate base, 50 to 100 cm. long, or in robust specimens as much as 2 m. long; ligule a dense ring of white hairs 1 to 2 mm. long; blades scaberulous and sometimes sparsely pilose on the upper surface, 10 to 50 cm. long, 3 to 20 mm. wide, the white midrib usually prominent; panicles terminal and axillary, mostly included at base, 10 to 40 cm. long or more, the main branches ascending; spikelets narrowly oblong-ovate, 2 to 3 mm., usually about 2.5 mm., long, acute. ☉ —Moist ground, along streams, and a weed in waste places and cultivated soil, Nova Scotia and



FIGURE 1032.—*Panicum arizonicum*. Two views of spikelet, and floret, $\times 10$. (Palmer 159, Mexico.)

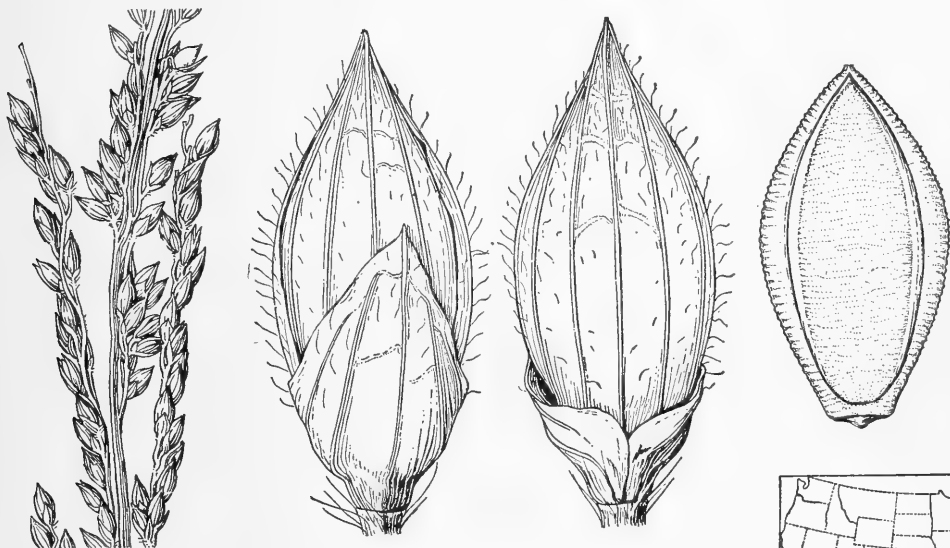


FIGURE 1033.—*Panicum texanum*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Hitchcock 3187, Tex.)

Maine to Minnesota, south to Florida and Texas, occasionally introduced farther west; here and there in the West Indies. *PANICUM DICHOTOMIFLORUM* var. *PURITANORUM* Svenson. Differing in the shorter, more slender culms and looser panicles and in the rather less-pointed spikelets about 2 mm. long. Intergrades with the species. ☉ —Wet sandy or boggy shores of ponds, Massachusetts, Connecticut, Long Island; Indiana.

126. *Panicum bartowense* Scribn. and Merr. (Fig. 1035.) Resembling

P. dichotomiflorum, mostly larger; culms erect, simple or sparingly branched, as much as 2 m. tall and 7 mm. thick; sheaths papillose-hispid; ligule 2 to 3 mm. long. ☉ —Low ground, often in shallow water, Florida; Bahamas; Cuba, Jamaica.

127. *Panicum lacustre* Hitchc. and Ekman. (Fig. 1036.) Aquatic or terrestrial perennial; culms nearly simple, those of terrestrial plants erect, about 1 m. tall, with short innovations with pilose sheaths and flat blades, 1 to 10 cm. long, 2 to 4



FIGURE 1034.—*Panicum dichotomiflorum*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Deam, Ind.)

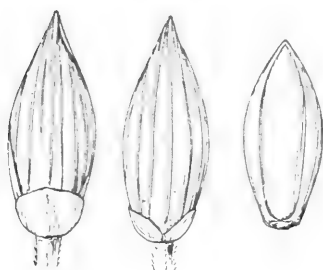


FIGURE 1035.—*Panicum bartowense*. Two views of spikelet, and floret, $\times 10$. (Type.)

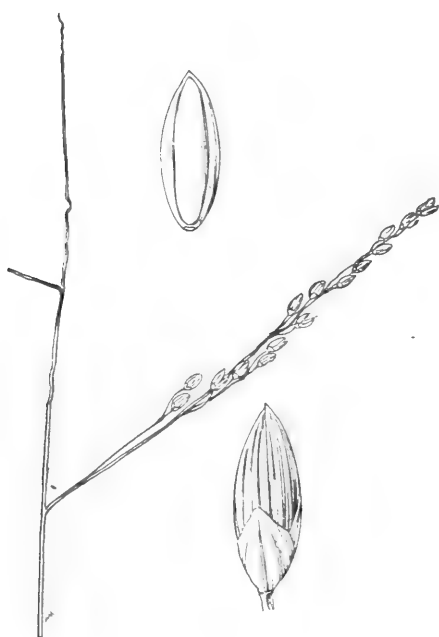


FIGURE 1036.—*Panicum lacustre*. Branch of panicle, $\times 1$; (Brass 15910, Fla.); spikelet and floret, $\times 10$. (Type.)

mm. wide, pilose on the upper surface; culm sheaths mostly longer than the internodes, but narrow, exposing the nodes, glabrous; ligule membranaceous, densely ciliate; blades flat or folded, 15 to 30 cm. long, 2 to 3 mm. wide, sparsely pilose on the upper surface; panicle erect, 10 to 25 cm. long, the rather distant branches ascending, with appressed branchlets except toward the base; spikelets 2 to 2.2 mm. long, subacute, glabrous; first glume one-fourth to one-third as long as the spikelet. 2l.—Edges of cypress ponds, west of Miles City, Collier County, Fla. The type, from western Cuba, is an aquatic plant with a succulent base rooting at the nodes and with loose papery lower sheaths.

5. Capillária. — Branching annuals, papillose-hispid, at least on the sheaths; ligules 1 to 3 mm. long; panicles many-flowered, mostly diffuse; spikelets pointed, 7- to 9-nerved, glabrous; first glume large, clasping; fruit smooth and shining, usually olive brown at maturity.

128. *Panicum flexile* (Gattinger) Scribn. (Fig. 1037.) Culms slender, erect, much-branched from the base, 20 to 70 cm. tall, somewhat hispid below, the nodes pubescent; blades erect but not stiff, glabrous or sparse-

ly hispid, as much as 30 cm. long, 2 to 6 mm. wide; panicles relatively few-flowered, oblong, narrow, 10 to 20 cm. long, about one-third as wide; spikelets 3.1 to 3.5 mm. long. ☉ —Sandy, mostly damp soil, meadows and open woods, eastern Canada and New York to North Dakota, south to Florida and Texas; introduced in Utah.

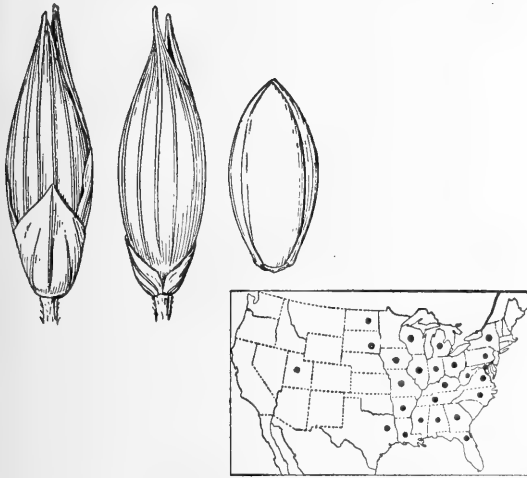


FIGURE 1037.—*Panicum flexile*. Two views of spikelet, and floret, $\times 10$. (Type.)

129. *Panicum gattingeri* Nash. (Fig. 1038.) Culms at first erect, soon decumbent and rooting at the lower nodes, papillose-hispid, in robust specimens as much as 1 m. long; blades 6 to 10 mm. wide, more or less hispid or nearly glabrous; panicles numerous, terminal and axillary, oval or elliptic in outline, the terminal 10 to 15 cm. long, the lateral smaller; spikelets 2 mm. long. ☉ —Open ground and waste places, often a weed in cultivated soil, New York and Ontario to Minnesota, south to North Carolina, Tennessee, and Arkansas.

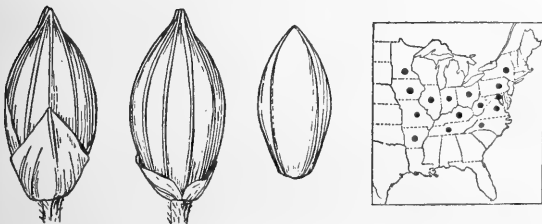


FIGURE 1038.—*Panicum gattingeri*. Two views of spikelet, and floret, $\times 10$. (Type.)

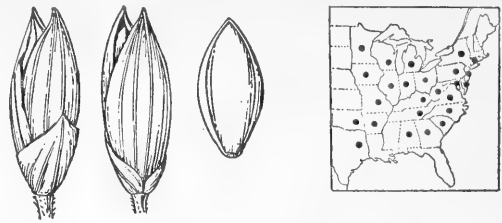


FIGURE 1039.—*Panicum philadelphicum*. Two views of spikelet, and floret, $\times 10$. (Type coll.)

130. *Panicum philadelphicum* Bernh. ex Trin. (Fig. 1039.) Plants light yellowish green; culms slender, usually erect, 15 to 50 cm. tall, papillose-hispid to nearly glabrous, more or less zigzag at base; blades usually erect, 5 to 15 cm. long, 2 to 6 mm. wide, rather sparsely hirsute; panicles 10 to 20 cm. long, few-flowered, the branches solitary, rather stiffly ascending, the axillary pulvini hispid; spikelets 1.7 to 2 mm. long, mostly in twos at the ends of the branchlets. ☉ —Dry open or sandy ground, Connecticut to Minnesota, south to Georgia and Texas.

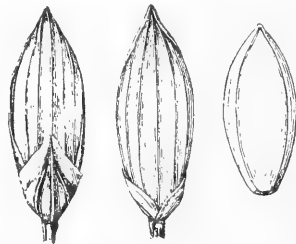


FIGURE 1040.—*Panicum lithophilum*. Two views of spikelet, and floret, $\times 10$. (Type.)

131. *Panicum lithophilum* Swallen. (Fig. 1040.) Culms 10 to 30 cm. tall, in small tufts, glabrous or sparsely hispid; sheaths papillose-hispid; blades erect, 6 to 8 cm. long, 2 to 4 mm. wide, conspicuously tinged with purple; panicles 7 to 15 cm. long, the branches stiffly spreading, few-flow-

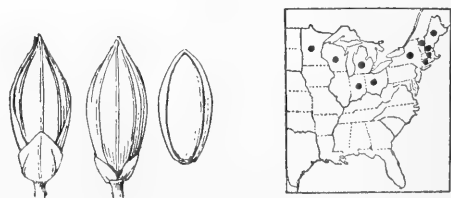


FIGURE 1041.—*Panicum tuckermanni*. Two views of spikelet, and floret, $\times 10$. (Type coll.)



FIGURE 1042.—*Panicum capillare*. Plant, $\times \frac{1}{2}$; two views of spikelet, and floret, $\times 10$. (V. H. Chase 774. Ill.)

ered; pulvini glabrous or very sparsely pilose; spikelets 2.1 to 2.2 mm. long, short-pedicel, appressed, in pairs at the ends of the branchlets. ☉ —Granite outcrops, Georgia.

132. *Panicum tuckermáni* Fernald. (Fig. 1041.) Resembling *P. philadelphicum* and intergrading with it; often spreading or prostrate and much branched at base; panicles more densely flowered, the branches more spreading, the axillary pulvini glabrous; spikelets somewhat racemously arranged, rather than in twos at the end. ☉ —Sandy or gravelly shores and open ground, Maine and eastern Canada to Connecticut and New York; Ohio and Indiana to Minnesota.

133. *Panicum capilláre* L. WITCH-GRASS. (Fig. 1042.) Culms erect or somewhat spreading at base, 20 to 80 cm. tall, papillose-hispid to nearly glabrous; sheaths hispid; blades 10 to 25 cm. long, 5 to 15 mm. wide, hispid on both surfaces; panicles densely flowered, very diffuse, often half the length of the entire plant, included at the base until maturity, the branches finally divaricately spreading, the whole panicle breaking away and rolling before the wind; spikelets 2 to 2.5 mm. long. ☉ —Open ground and waste places, a weed in cultivated ground, Maine to Montana, south to Florida and Texas, and occasionally west of this area.

PANICUM CAPILLARE var. **occidentále** Rydb. Usually with short flowering branches at the base; blades shorter, less pubescent, crowded toward the base, panicles more exerted and divaricate; spikelets usually about 3 mm. long (2.5 to 3.3 mm.), attenuate at tip; fruit 1.7 to 1.8 mm. long. ☉ (*P. barbipulvinatum* Nash.)—Open ground and waste places, Prince Edward Island and Quebec to British Columbia, south to New Jersey, Missouri, Texas, and California, more common westward.

134. *Panicum hillmáni* Chase. (Fig. 1043.) Resembling *P. capillare*, espe-



FIGURE 1043.—*Panicum hillmani*. Two views of spikelet, and floret, $\times 10$. (Type.)

cially the var. *occidentale*, differing from this in having no short flowering branches at the base, in the stouter culms, firmer foliage, stiffer panicle branches with the lateral spikelets on shorter more appressed pedicels, in the well-developed sterile palea, and especially in the larger darker fruit (2 mm. long) with a prominent lunate scar at the base. ☉ —Prairies and plains, Kansas to Texas; California.

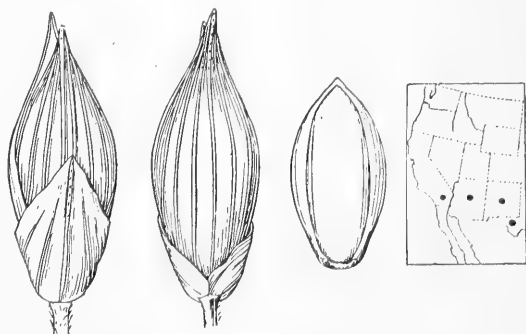


FIGURE 1044.—*Panicum hirticaule*. Two views of spikelet, and floret, $\times 10$. (Type.)

135. *Panicum hirticaule* Presl. (Fig. 1044.) Culms usually simple or nearly so, 15 to 70 cm. tall, papillose-hispid to nearly glabrous; blades 5 to 15 cm. long, 4 to 13 mm. wide, often cordate at base, sparsely hispid or nearly glabrous, ciliate toward base; panicles 5 to 15 cm. long, scarcely one-third the entire height of the plant; spikelets 2.7 to 3.3 mm. long, lanceolate-fusiform, acuminate, usually reddish brown; first glume half to three-fourths the length of the spikelet; fruit 2 mm. long. ☉ —Rocky or sandy soil, Arkansas and western Texas to Southern California; Mexico to western South America; Argentina.

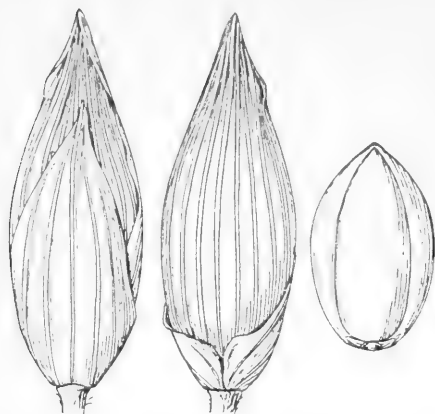


FIGURE 1045.—*Panicum pampinosum*. Two views of spikelet, and floret, $\times 10$. (Type.)

136. *Panicum pampinosum* Hitchc. and Chase. (Fig. 1045.) Resembling *P. hirticaule*, but freely branching and with larger spikelet; spikelets very turgid, about 4 mm. long; first glume more than three-fourths the length of the spikelet; second glume and sterile lemma equal; fruit 2.2 mm. long. ☉ —Mesas, Texas to Arizona; Mexico.

137. *Panicum stramineum* Hitchc. and Chase. (Fig. 1046.) Resembling *P. hirticaule*, but freely branching and nearly glabrous throughout; blades longer; spikelets more turgid, less pointed, 3.2 to 3.7 mm. long, the first glume about one-third the length of the spikelet; fruit 2.2 mm. long, with a prominent lunate scar at base. ☉ —Rich bottom lands and damp soil, southern Arizona; northwestern Mexico.



FIGURE 1046.—*Panicum stramineum*. Two views of spikelet, and floret, $\times 10$. (Type.)

***Panicum sonorum* Beal.** Robust, 60 cm. to 1 m. or more tall; sheaths mostly papillose-hispid; blades elongate, 15 to 30 mm. wide; panicles large, drooping, brownish, densely flowered; spikelets 3 to 3.3 mm. long, lanceolate; first glume half to two-thirds as long as the spikelet; second glume slightly exceeding the sterile lemma. ☉ —Yuma, Ariz., possibly introduced. Northern Mexico. Cultivated by Cocopa Indians, the seed used for food.

138. *Panicum miliaceum* L. BROOM-CORN MILLET. (Fig. 1047.) Culms stout, erect or decumbent at base, 20 to 100 cm. tall; blades more or less pilose on both surfaces or glabrate, as much as 30 cm. long and 2 cm. wide, rounded at base; panicles usually more or less included at base, 10 to 30 cm. long, usually nodding, rather

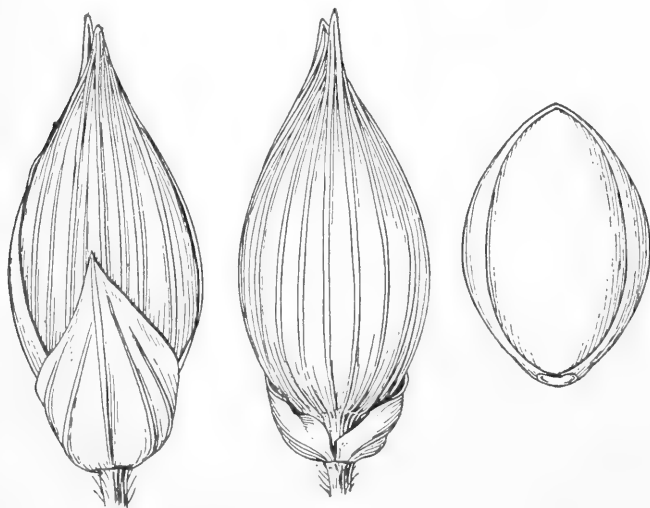


FIGURE 1047.—*Panicum miliaceum*. Two views of spikelet, and floret, $\times 10$. (Griffith 6490, India.)

compact, the numerous branches ascending, very scabrous, spikelet-bearing toward the ends; spikelets 4.5 to 5 mm. long, ovate, acuminate, strongly many-nerved; fruit 3 mm. long, stramineous to reddish brown. ☉ —Waste places, introduced or escaped from cultivation, Northeastern States and occasional in other parts of the United States; temperate parts of the Old World. Broomcorn millet is cultivated in the cooler parts of the United States to a limited extent for forage and occasionally the seed is used for feed for hogs, hence it is sometimes known as hog millet. Also called proso. Commonly cultivated in Europe and western Asia.

6. Diffusa.—Perennials; culms stiff, mostly tufted; sheaths mostly hirsute; ligules membranaceous, ciliate; spikelets pointed, 7- to 9-nerved, glabrous; fruit smooth and shining.

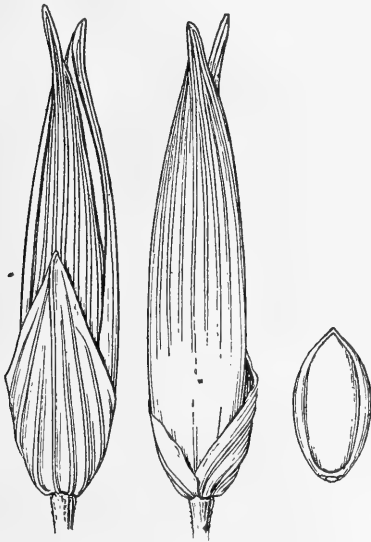


FIGURE 1048.—*Panicum capillarioides*. Two views of spikelet, and floret, $\times 10$. (Type.)

139. *Panicum capillarioides* Vasey. (Fig. 1048.) Culms erect or ascending from a knotted crown, 30 to 55 cm. tall, appressed-pubescent or glabrate, the nodes densely ascending-pubescent; blades rather stiff, 10 to 30 cm. long, 2 to 10 mm. wide, flat, harshly papillose-pubescent; panicle diffuse,

few-flowered, 10 to 20 cm. long, the capillary branches stiffly spreading at maturity; spikelets 5 to 6 cm. long, lanceolate, long-acuminate, fruit 1.6 to 1.8 mm. long. ☉ —Prairies and plains, southern Texas and northern Mexico. This species is readily distinguished from all others by the peculiar elongated second glume and sterile lemma.

***Panicum bérgei* Arech.** Tufted, with numerous leaves clustered at base; sheaths hispid; blades involute; panicle very diffuse, a third or more the entire height of the plant, the lower branches verticillate, conspicuously pilose in the axils; spikelets short-pointed, 2.2 to 2.6 mm. long. ☉ —Weed in grass plots, Experiment Station, Tifton, Ga. Adventive from South America.

***Panicum pilcomáyense* Hack.** Culms robust, few together, 70 to 100 cm. tall, at least the lower nodes with a ring of erect hairs; blades flat, elongate, 4 to 8 mm. wide; panicle very diffuse, nearly half the height of the plant, the branches to 30 cm. long, in fascicles of 2 to 4 or solitary, scabrous, naked below, loosely branched toward the ends, at least the lower axils pilose; spikelets about 3 mm. long, on appressed pedicels. ☉ —Collegeport, Matagorda County, Tex. Probably introduced from Paraguay.

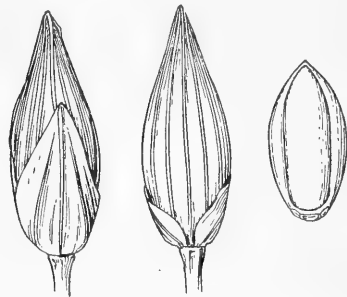


FIGURE 1049.—*Panicum filipes*. Two views of spikelet, and floret, $\times 10$. (Type.)

140. *Panicum filipes* Scribn. (Fig. 1049.) Culms 30 to 80 cm. tall, erect or ascending; blades laxly ascending or spreading, 10 to 25 cm. long, 3 to 8 mm. wide, flat, glaucous, glabrous or sometimes sparsely hirsute beneath; panicles 7 to 25 cm. long, usu-



FIGURE 1050.—*Panicum hallii*. Plant, $\times 1$; two views of spikelet, and floret, $\times 10$. (Type.)

ally equaled or exceeded by the upper blades, the distant branches spreading; spikelets 2 to 2.6 mm. long. ♀ —Low open ground or among chaparral, Louisiana (Shreveport) and Texas; northeastern Mexico. Distinguished from *P. hallii* by the longer blades, looser panicle, and smaller spikelets.

141. *Panicum hallii* Vasey. HAL'S PANICUM. (Fig. 1050.) Somewhat glaucous green, leaves usually crowded toward the base, the blades curling like shavings with age; culms erect, 15 to 60 cm. tall; sheaths sparsely papillose-hispid to glabrous; blades erect or nearly so, flat, 4 to 15 cm. long, 2 to 6 mm. wide, sparsely ciliate toward base, otherwise glabrous or nearly so; panicle 6 to 20 cm. long, the few branches stiffly ascending; spikelets 3 to 3.7 mm. long. ♀ —Dry prairie, rocky and gravelly hills and canyons, and in bottom lands and irrigated fields, Oklahoma and Colorado to Texas and Arizona; Mexico.

142. *Panicum lepidulum* Hitchc. and Chase. (Fig. 1051.) Culms 25 to 70 cm. tall, erect, usually sparingly branching from lower nodes, sparsely

pilose to scabrous; blades suberect, 7 to 30 cm. long, 5 to 10 mm. wide, sparsely papillose-pilose to nearly glabrous; panicle 7 to 20 cm. long, usually scarcely half as wide, branches ascending with short spreading branchlets with 1 to 3 spikelets; spikelets 4 to 4.2 mm. long, turgid. ♀ —Moist places mostly in the uplands, Utah, New Mexico, Arizona, and Mexico.

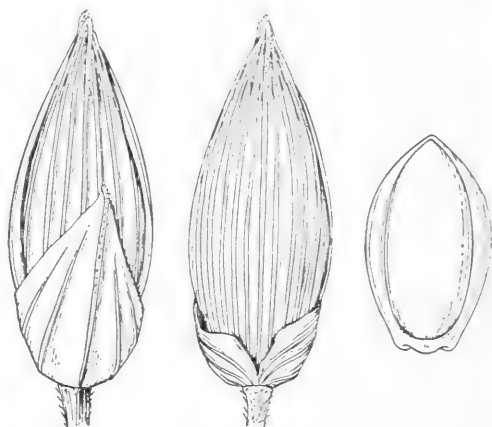


FIGURE 1051.—*Panicum lepidulum*. Two views of spikelet, and floret, $\times 10$. (Type.)

143. *Panicum ghiesbréghtii* Fourn. (Fig. 1052.) Culms erect, rather robust, ascending-hirsute, 60 to 80 cm. tall, the nodes densely hirsute; blades as much as 60 cm. long and 12 mm. wide, flat, papillose-hirsute to glabrescent; panicles 20 to 30 cm. long, usually less than half as wide, the branches ascending, naked at base, the branchlets more or less appressed; spikelets 3 mm. long, 1 mm. wide. ♀ —Low moist ground, southern Texas; tropical America.

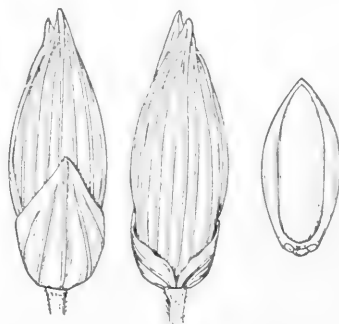


FIGURE 1052.—*Panicum ghiesbreghtii*. Two views of spikelet, and floret, $\times 10$. (Type.)

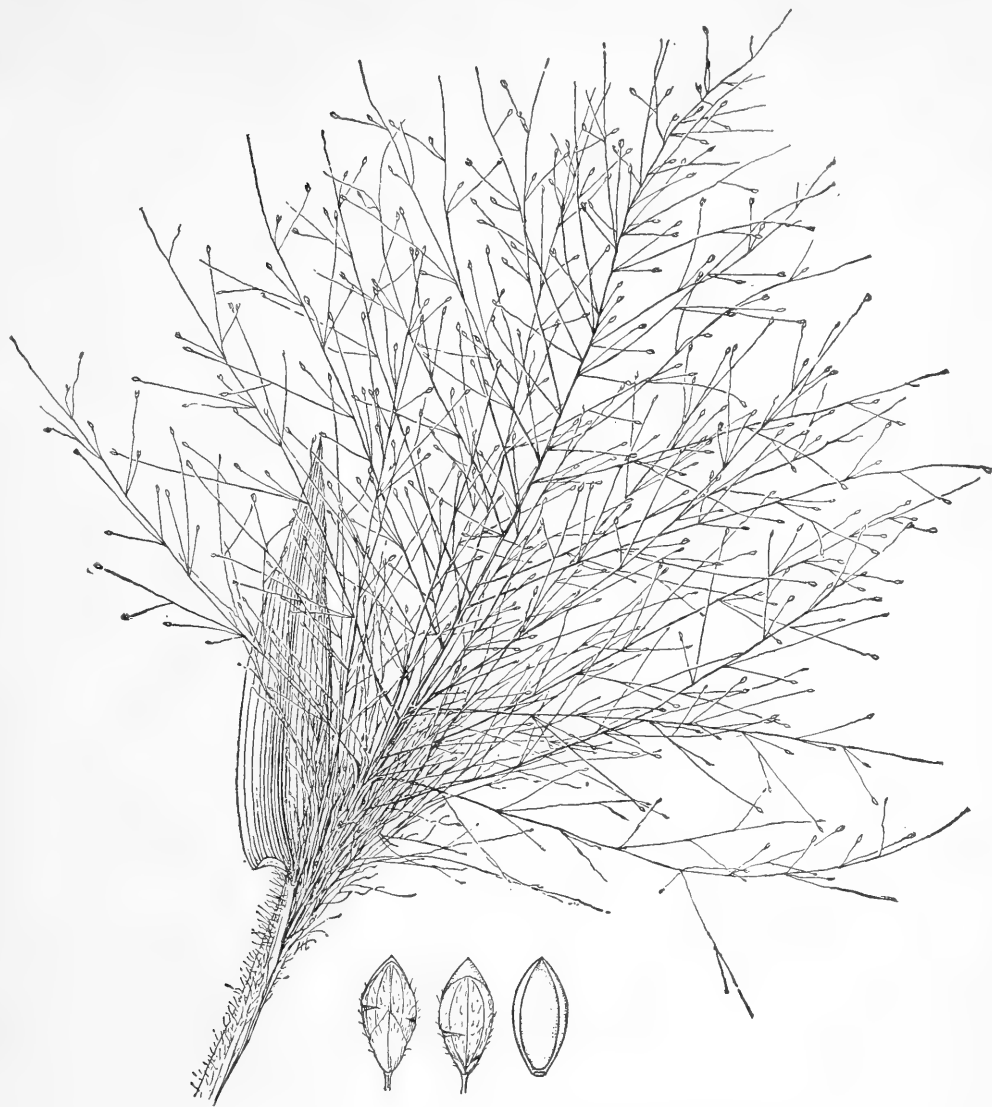


FIGURE 1054.—*Panicum trichoides*. Panicle, $\times 1$. (Runyon 1873, Tex.); two views of spikelet, and floret, $\times 10$. (Type.)

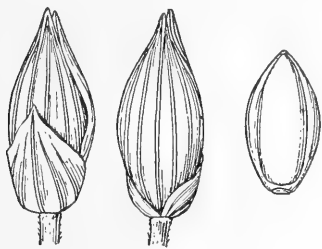


FIGURE 1053.—*Panicum hirsutum*. Two views of spikelet, and floret, $\times 10$. (Type.)

144. *Panicum hirsutum* Swartz. (Fig. 1053.) Culms robust, erect, as much as 1.5 m. tall and 1 cm. thick, simple or branched at base only; nodes appressed-pubescent; sheaths papillose-hirsute, the hairs stiff, spreading, fragile, causing mechanical

irritation to the skin when handled; blades flat, as much as 60 cm. long and 3.5 cm. wide, glabrous; panicle 20 to 35 cm. long, at first condensed, finally open, the branches ascending; spikelets 2 to 2.2 mm. long. ♀ — Open moist ground, southern Texas; tropical America at low altitudes.

7. *Trichoidea*.—Decumbent, spreading, freely branching annual; blades ovate to ovate-lanceolate; panicles diffuse, with capillary branches; spikelets minute.

145. *Panicum trichoides* Swartz. (Fig. 1054.) Culms slender, widely creeping; freely branching; sheaths mostly longer than the internodes,



FIGURE 1055.—*Panicum maximum*. Plant, $\times \frac{1}{2}$; two views of spikelet, and floret, $\times 10$. (Combs and Baker 1170, Fla.)

pilose; blades 4 to 7 cm. long, 8 to 15 mm. wide, thin, ovate-lanceolate, asymmetrical, ciliate at the base; panicles 8 to 15 cm. long, the slender ascending to spreading branches with capillary, spreading, few-flowered branchlets; spikelets about 1.3 mm. long, acute, sparsely pubescent. ☉ —Waste places, woods and open ground, Texas (Brownsville); Mexico and the West Indies to Peru and Brazil; southeastern Asia and the Philippines.

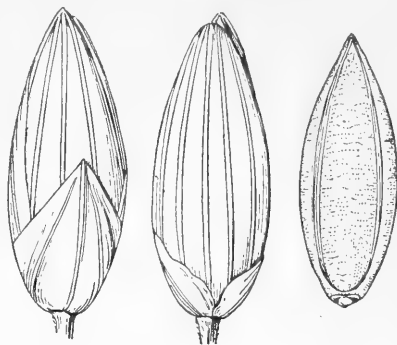


FIGURE 1056.—*Panicum plenum*. Two views of spikelet, and floret, $\times 10$. (Type.)

8. **Máxima**.—Tall robust perennials; ligules membranaceous, ciliate; blades linear, flat; panicles large, many-flowered; spikelets ellipsoid, faintly nerved, glabrous; fruit transversely rugose.

146. *Panicum máximum* Jacq. GUINEA GRASS. (Fig. 1055.) Plants light green, in large bunches from short stout rhizomes; culms mostly erect, the nodes usually densely hirsute; sheaths papillose-hirsute to glabrous, usually densely pubescent on the collar; ligule 4 to 6 mm. long; blades 30 to 75 cm. long, as much as 3.5 cm. wide, glabrous, very scabrous on the margins, sometimes hirsute on the upper surface near the base; panicles 20 to 50 cm. long, about one-third as wide, the long rather stiff branches ascending, naked at base, the lower in whorls, the axils pilose, the branchlets short, appressed, bearing more or less clustered short-pediceled spikelets; spikelets 3 to 3.3 mm. long; first glume about one-third the length of the spikelet. 2 —Fields and waste places, southern Florida, and southern Texas, introduced from Africa; tropical regions of both hemispheres at low altitudes. Guinea grass is the most important cultivated forage grass of tropical America. It grows in moderately dry ground and can be used for pasture or for soiling. Much of the green feed cut for forage is this species.

147. *Panicum plénum* Hitchc. and Chase. (Fig. 1056.) Plants mostly in large clumps, mostly glaucous from

a stout rhizome; culms 1 to 2 m. tall, erect from a usually decumbent base, compressed; sheaths glabrous, somewhat keeled; blades 20 to 35 cm. long, 7 to 17 mm. wide, glabrous or nearly so; panicle 20 to 50 cm. long, open; spikelets 3 to 3.4 mm. long. 2 —Moist places in rocky hills and canyons, Texas to Arizona; Mexico. Differs from *P. bulbosum* in the absence of the basal corm.

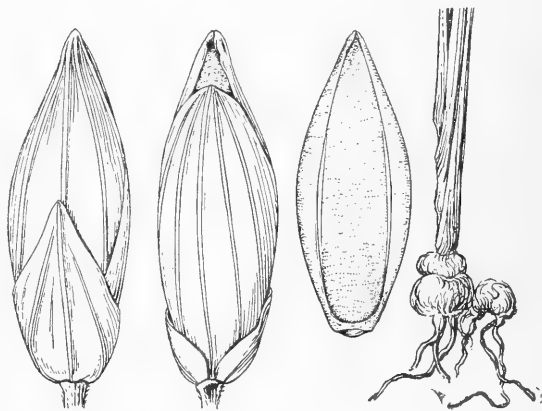


FIGURE 1057.—*Panicum bulbosum*. Base of culm, $\times \frac{1}{2}$; two views of spikelet, and floret, $\times 10$. (Lemmon 2914, Ariz.)

148. *Panicum bulbósum* H. B. K. BULB PANICUM. (Fig. 1057.) Culms in tufts, 1 to 2 m. tall, erect, the lowest internode thickened to a hard cormlike base 1 to 2 cm. thick, budding at base, sometimes with one or more corms of previous years attached; sheaths glabrous or pilose toward the summit; blades 25 to 60 cm. long, 3 to 12 mm. wide, scabrous above, glabrous beneath; panicle 20 to 50 cm. long, open; spikelets



FIGURE 1058.—*Panicum repens*. Plant, $\times \frac{1}{2}$; two views of spikelet, and floret, $\times 10$. (Hitchcock 14145, Hawaii.)

3.5 to 4.2 mm. long. 2 —Moist places in canyons and valleys, western Texas to Arizona; Mexico.

PANICUM BULBOSUM var. **MÍNUS** Vasey. Culms slender, mostly less than 1 m. tall, the corms smaller than in the species; blades mostly 2 to 4 mm. wide; spikelets 2.8 to 3.2 mm. long. 2 (*P. bulbosum* var. *sciaphilum* Hitchc. and Chase.)—Same range as the species and more common in the United States.

9. Virgáta.—Perennials from stout rhizomes; culms mostly stout; ligules membranaceous, ciliate; blades linear, mostly firm; spikelets turgid, usually gaping, strongly 5- to 9-nerved, glabrous, pointed; lower floret usually staminate; fruit smooth and shining.

149. Panicum répens L. (Fig. 1058.) Culms rigid, 30 to 80 cm. tall, erect from the nodes of strong horizontal often extensively creeping rhizomes, clothed at base with bladeless sheaths; sheaths more or less pilose; blades flat or folded, 2 to 5 mm. wide, sparsely pilose to glabrous; panicle open, 7 to 12 cm. long, the somewhat distant branches stiffly ascending; spikelets 2.2 to 2.5 mm. long, ovate; first glume about one-fifth as long as the spikelet, loose, truncate. 2 —Sea beaches along the Gulf coast, Florida to Texas. Tropical and subtropical coasts of both hemispheres, possibly introduced in America.

150. Panicum gouíni Fourn. (Fig. 1059.) Resembling *P. repens*, but the culms usually less than 30 cm. tall; sheaths and blades usually glabrous; panicle smaller, more densely flowered; first glume longer. 2 —Sea beaches, Alabama to Louisiana; Gulf coast of Mexico.

151. Panicum virgátum L. SWITCH-GRASS. (Fig. 1060.) Plants usually in large bunches, green or glaucous, with numerous scaly creeping rhizomes; culms erect, tough and hard, 1 to 2 m., rarely to 3 m., tall; sheaths gla-

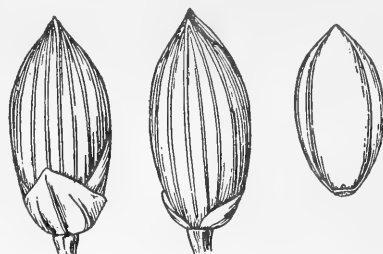


FIGURE 1059.—*Panicum gouini*. Two views of spikelet, and floret, $\times 10$. (Type.)

brous; blades 10 to 60 cm. long, 3 to 15 mm. wide, flat, glabrous, or sometimes pilose above near the base, rarely pilose all over; panicle 15 to 50 cm. long, open, sometimes diffuse; spikelets 3.5 to 5 mm. long, acuminate; first glume clasping, two-thirds to three-fourths as long as the spikelet, acuminate or cuspidate; fruit narrowly ovate, the margins of the lemma inrolled only at base. 2 —Prairies and open ground, open woods, and brackish marshes, Nova Scotia and Ontario, Maine to North Dakota and Wyoming, south to Florida, Nevada, and Arizona; Mexico and Central America.

PANICUM VIRGATUM var. **CUBENSE** Griseb. Culms more slender, usually solitary or few in a tuft; panicle narrower, with ascending branches; spikelets 2.8 to 3.2 mm. long, the second glume and sterile lemma not extending much beyond the fruit. 2 —Pine woods, Coastal Plain, Massachusetts to Florida, Michigan, Wisconsin, Tennessee (Coffee County), and Mississippi; Michigan; Cuba.

PANICUM VIRGATUM var. **SPÍSSUM** Linder. Culms from short stout knotty rhizomes. 2 —Nova Scotia to Pennsylvania.

152. Panicum havárdii Vasey. (Fig. 1061.) Pale green, glaucous, glabrous throughout; culms robust, solitary, 1 m. tall or more, erect from creeping rhizomes; blades 5 to 10 mm. wide, tapering into long involute-setaceous tips; panicle as much as 40 cm. long; spikelets 6 to 8 mm. long. 2 —Arroyos and sand hills, western Texas and southern New Mexico; northern Mexico.



FIGURE 1060.—*Panicum virgatum*. Plant, $\times \frac{1}{2}$; two views of spikelet, and floret, $\times 10$. (V. H. Chase, Ill.)



FIGURE 1061.—*Panicum havardii*. Two views of spikelet, and floret, $\times 10$. (Type.)

153. *Panicum amarum* Ell. (Fig. 1062.) Glaucous and glabrous throughout; culms solitary from extensively creeping rhizomes, 30 to 100 cm. tall; blades thick, 10 to 30 cm. long, 5 to 12 mm. wide, flat, involute toward the tip, the margins smooth; panicle one-fourth to one-third the height of the plant, not more than 3 cm. wide,

the branches appressed; spikelets 5 to 6.5 mm. long, acuminate. 2l — Sandy seashores and coast dunes, Connecticut to Georgia; southern Mississippi; Texas.

154. *Panicum amarulum* Hitchc. and Chase. (Fig. 1063.) Culms as much as 1 cm. thick, in large bunches as much as 1 m. across, 1 to 2 m.

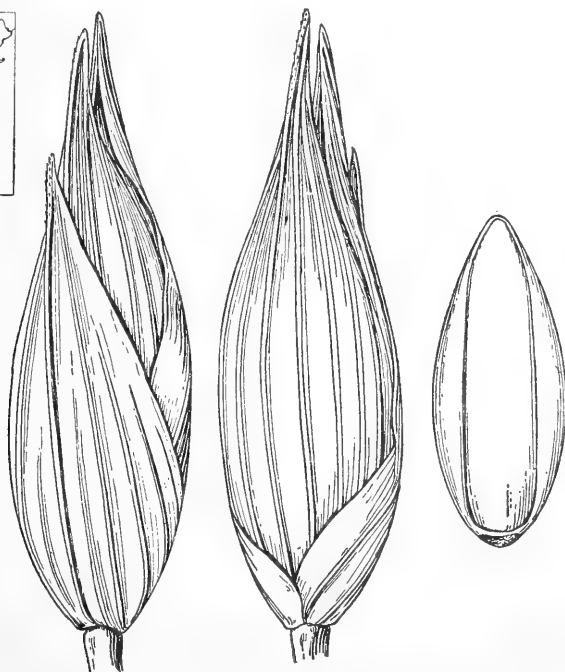


FIGURE 1062.—*Panicum amarum*. Two views of spikelet, and floret, $\times 10$. (Vasey, Va.)



FIGURE 1063.—*Panicum amarulum*. Two views of spikelet, and floret, $\times 10$. (Type.)

tall, glaucous; rhizomes vertical or ascending; blades 20 to 50 cm. long, 5 to 12 mm. wide, more or less involute, pilose on the upper surface near the base; panicle large, rather compact, 5 to 10 cm. wide, slightly nodding, densely flowered; spikelets 4.3 to 5.5 mm. long, acuminate. 21 —Sandy shores and coast dunes, New Jersey to Virginia; Florida; Louisiana and Texas; introduced in West Virginia; Yucatan; Bahamas; Cuba.

10. Ténera.—Perennials; culms subcompressed, wiry; ligules minute; spikelets short-pedicceled; fruit smooth and shining.

155. *Panicum ténerum* Beyr. (Fig. 1064.) Culms in small tufts from a

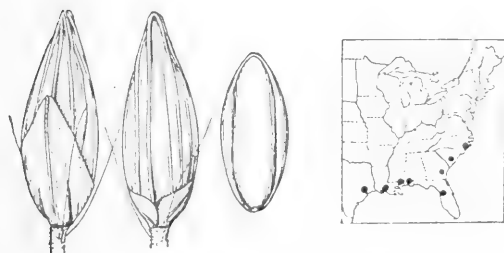


FIGURE 1064.—*Panicum tenerum*. Two views of spikelet, and floret, $\times 10$. (Type.)

knotted crown, erect, 40 to 90 cm. tall; lower sheaths pubescent toward the summit, with spreading hairs; blades 4 to 15 cm. long, 2 to 4 mm. wide, erect, firm, subinvolute, pilose on upper surface toward base; panicles 3 to 8 cm. long, very slender, terminal and axillary; spikelets 2.2 to 2.8 mm. long, pointed, glabrous; the pedicel usually with a few long hairs. 21 —Margins of swamps and wet places in pine barrens near the coast, North Carolina to Florida and Texas; West Indies.

11. Agrostóidea.—Tufted perennials; culms erect, compressed; sheaths keeled; ligules membranaceous, mostly about 1 mm. long; spikelets short-pedicceled, lanceolate, pointed, 5- to 7-nerved, glabrous; glumes and sterile lemma mostly keeled; fruit smooth and shining, with a minute tuft of thickish hairs at apex.

156. *Panicum abscissum* Swallen. (Fig. 1065.) Culms 50 to 70 cm. tall, densely tufted, compressed; lower

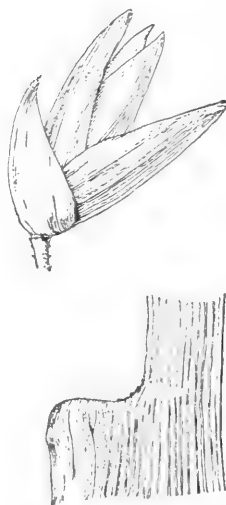


FIGURE 1065.—*Panicum abscissum*. Spikelet and summit of sheath, $\times 10$. (Type.)

sheaths broad, strongly keeled, crowded, 3 to 4 mm. wide from keel to margin, truncate or extended at the summit into short, broad, obtuse auricles; blades 15 to 25 cm. long, 1 to 2 mm. wide, folded, glabrous or scabrous; panicles terminal and axil-

lary, 7 to 15 cm. long, the branches ascending or appressed; spikelets 2.8 to 3 mm. long, obliquely set on the pedicels. ♀ —Sandy or swampy woods, central Florida.

157. *Panicum agrostoides* Spreng. (Fig. 1066.) In dense clumps from a short crown, with numerous short-leaved innovations at base; culms 50 to 100 cm. tall; blades erect, folded at base, flat above, 20 to 50 cm. long, 5 to 12 mm. wide; panicles terminal and axillary, 10 to 30 cm. long, half to two-thirds as wide, sometimes more diffuse, the densely flowered branchlets mostly on the under side of the branches, the pedicels usually bearing at the summit one to several delicate hairs; spikelets about 2 mm. long. ♀ —Wet meadows and

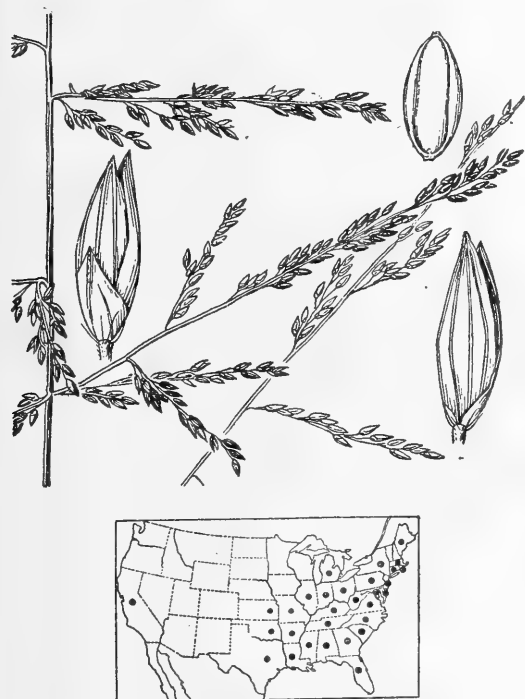


FIGURE 1066.—*Panicum agrostoides*. Panicle, $\times 1$; two views of spikelet, and floret, $\times 10$. (Fisher 30, N. J.)

shores, Maine to Kansas, south to Florida and Texas; Vancouver Island; California; British Honduras.

PANICUM AGROSTOIDES var. **RAMÓSIUS** (Mohr) Fernald. Panicles more open and loosely flowered than in the species; spikelets more or less secund on the branchlets, slender and

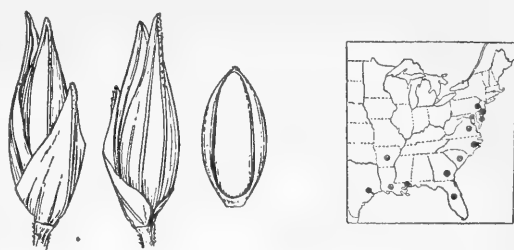


FIGURE 1067.—*Panicum condensum*. Two views of spikelet, and floret, $\times 10$. (Type.)

more pointed, resembling *P. stipitatum* Nash. ♀ —Virginia to Florida and Texas.

158. *Panicum condensum* Nash. (Fig. 1067.) Resembling *P. agrostoides*; culms on the average taller; blades often sparsely pilose on the upper side at the folded base; panicles 10 to 25 cm. long, rarely more than 5 cm. wide, the long branches erect, naked at base, with appressed branchlets bearing crowded spikelets, the pedicels not pilose; spikelets 2.2 to 2.5 mm. long. ♀ —Borders of streams and ponds and in wet places, Coastal Plain, Pennsylvania to Florida, Arkansas, and Texas; West Indies.

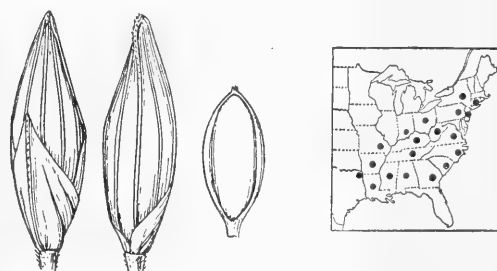


FIGURE 1068.—*Panicum stipitatum*. Two views of spikelet, and floret, $\times 10$. (Commons 305, Del.)

159. *Panicum stipitatum* Nash. (Fig. 1068.) Resembling *P. agrostoides*; often purple-tinged throughout, especially the panicles; sheaths much overlapping, the blades usually equaling or exceeding the terminal panicle; panicles usually several to a culm, 10 to 20 cm. long, narrow, densely flowered, the numerous stiff branches ascending, with numerous divaricate branchlets, mostly on the lower side; spikelets 2.5 to 2.8 mm. long, often curved at the tip. ♀ —

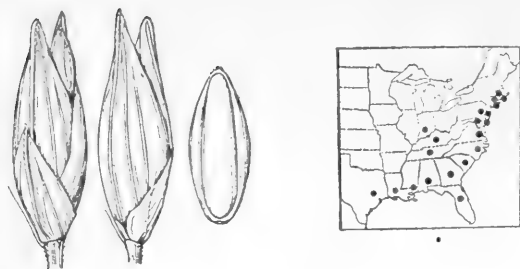


FIGURE 1069.—*Panicum longifolium*. Two views of spikelet, and floret, $\times 10$. (Type.)

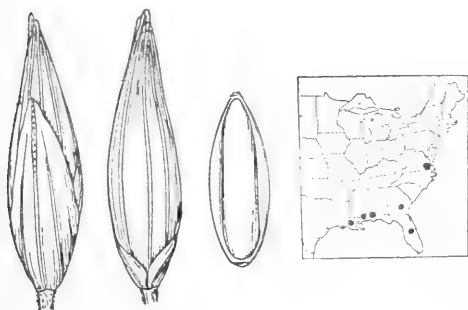


FIGURE 1070.—*Panicum combsii*. Two views of spikelet, and floret, $\times 10$. (Type.)

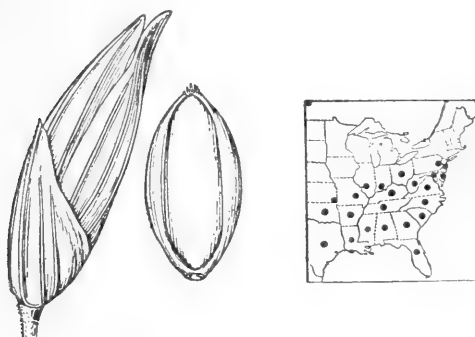


FIGURE 1071.—*Panicum anceps*. Spikelet and floret, $\times 10$. (Type.)

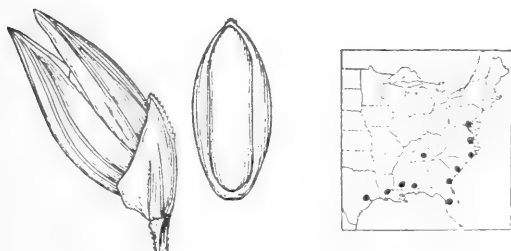


FIGURE 1072.—*Panicum rhizomatum*. Spikelet and floret, $\times 10$. (Type.)

Moist soil, Connecticut to Missouri, south to Georgia and Texas.

160. *Panicum longifolium* Torr. (Fig. 1069.) Culms rather slender, 35 to 80 cm. tall, in dense tufts, usually surrounded by basal leaves nearly half as long; sheaths usually villous

near the summit; ligule fimbriate-ciliate, 2 to 3 mm. long; blades elongate, 2 to 5 mm. wide, pilose on the upper surface near the base; lateral panicles few or none, the terminal 10 to 25 cm. long, the branches slender, ascending; spikelets 2.4 to 2.7 mm. long. ♀ —Moist sandy ground, Massachusetts to Florida and Texas to Indiana and Tennessee.

161. *Panicum combsii* Scribn. and Ball. (Fig. 1070.) Resembling *P. longifolium*; sheaths glabrous or nearly so; ligule less than 1 mm. long; blades on the average shorter; spikelets 3 to 3.5 mm. long, acuminate. ♀ —Margins of ponds and wet woods, southeastern Virginia; Georgia and Florida to Louisiana.

162. *Panicum anceps* Michx. (Fig. 1071.) Culms 50 to 100 cm. tall, with numerous scaly rhizomes; sheaths glabrous or pilose; blades elongate, 4 to 12 mm. wide, pilose above near the base; panicles 15 to 40 cm. long, the slender, remote branches somewhat spreading, bearing short mostly appressed branchlets with rather crowded somewhat curved subsecund spikelets, set obliquely on their pedicels; spikelets 3.4 to 3.8 mm. long. ♀ —Moist sandy soil, New Jersey to Kansas, south to Florida and Texas.

163. *Panicum rhizomatum* Hitchc. and Chase. (Fig. 1072.) Resembling *P. anceps*; culms less robust, the rhizomes more slender and numerous; sheaths densely to sparsely villous, especially at the summit; blades usually pubescent on both surfaces; panicles more or less contracted; spikelets 2.4 to 2.8 mm. long. ♀ —Moist sandy woods and savannas, Coastal Plain, Maryland to Florida and Texas; Tennessee.

12. *Láxa*.—Slender perennials; culms compressed; ligules minute; spikelets short-pedicel, 5-nerved, glabrous, the palea of the sterile floret becoming enlarged and indurate, expanding the spikelet at maturity; fruit min-

utely papillose-roughened, relatively thin in texture.

164. *Panicum híans* Ell. (Fig. 1073.) Culms 20 to 60 cm. tall, mostly erect, sometimes more or less decumbent or prostrate with erect branches; blades 5 to 15 cm. long, 1 to 5 mm. wide, flat or folded, pilose on the upper surface near base; panicles 5 to 20 cm. long, usually loose and open, the primary branches few, slender, distant, spreading or drooping, the branchlets borne on the upper half or towards the ends only; spikelets in more or less secund clusters, 2.2 to 2.4 mm. long, at maturity about twice as thick as wide. ☼ —Damp soil along ponds and streams, Virginia to Florida and New Mexico; Tennessee; Oklahoma and southern Missouri; Mexico.

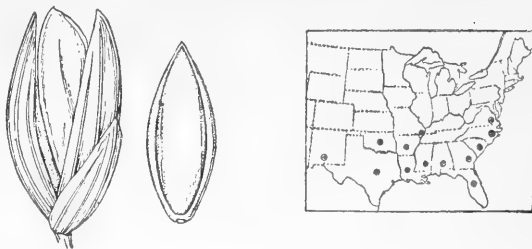


FIGURE 1073.—*Panicum híans*. Spikelet and floret, $\times 10$. (Type.)

13. *Verrucósa*.—Glabrous branching annuals; culms slender, weak, decumbent at base, usually with stilt-roots; ligules minute; panicles with divaricate capillary branches, spikelet-bearing toward the ends, the spikelets mostly in twos; spikelets tuberculate, nerves obscure or obsolete; first glume minute; fruit minutely papillose, margin of the lemma inrolled only at base.

165. *Panicum verrucósum* Muhl. (Fig. 1074.) Bright green, at first erect, later widely spreading; culms 20 to 150 cm. long; blades thin, flat, lax, 5 to 20 cm. long, 4 to 10 mm. wide; panicles 5 to 30 cm. long, about as wide, diffuse, small panicles often produced at the lower nodes; spikelets 1.8 to 2.1 mm. long, elliptic-obovate, subacute, roughened with small warts. ☼ —Wet, mostly shady soil, Massachusetts to Florida, west to Michigan, Kentucky, Arkansas and Texas.

166. *Panicum brachyáanthum* Steud. (Fig. 1075.) Culms 30 to 100 cm. tall; blades 5 to 15 cm. long, 2 to 3 mm. wide; panicles 5 to 15 cm. long, the branches few; spikelets 3.2 to 3.6 mm. long, fusiform, acute, tu-

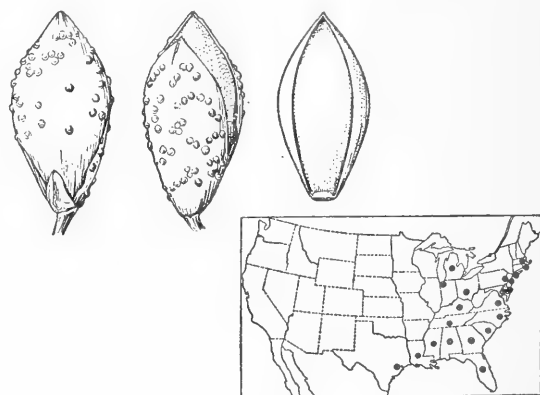


FIGURE 1074.—*Panicum verrucosum*. Two views of spikelet, and floret, $\times 10$. (Type.)

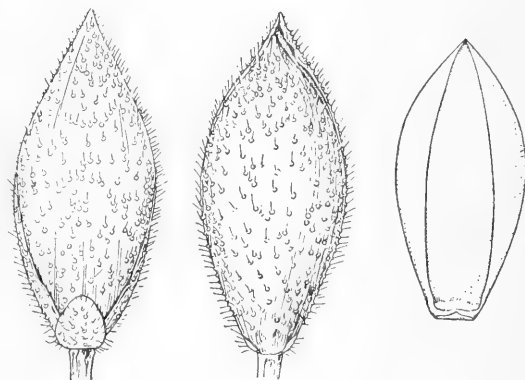


FIGURE 1075.—*Panicum brachyanthum*. Two views of spikelet, and floret, $\times 10$. (Type.)

berculate-hispid. ☼ —Sandy soil, Arkansas, Louisiana, Texas, and Oklahoma.

14. *Urvilleána*.—Robust perennials; spikelets large, densely villous; fertile lemma long-villous on the margin.

167. *Panicum urvilleánum* Kunth. (Fig. 1076.) Culms solitary or few in a tuft, 50 to 100 cm. tall, erect from a creeping rhizome; nodes densely bearded; sheaths overlapping, densely retrorse-villous; blades elongate, 4 to 7 mm. wide, tapering from a flat base



FIGURE 1076.—*Panicum urvilleanum*. Two views of spikelet, and floret, $\times 10$. (Type.)

to a long involute setaceous point, strigose or glabrous; panicle 25 to 30 cm. long, the slender branches ascending; spikelets 6 to 7 mm. long, densely silvery- or tawny-villous; first glume clasping, from two-thirds to nearly as long as the spikelet. 2 —Sandy deserts, Arizona and southern California; Argentina, Chile.

15. Obtúsa.—Stoloniferous wiry perennial; ligules about 1 mm. long; panicles narrow, the few appressed branches densely flowered; spikelets short-pedicelated, secund, glabrous; fruit smooth and shining.

168. *Panicum obtusum* H. B. K. VINE-MESQUITE. (Fig. 1077.) Tufted from a knotted crown, the stolons sometimes 2 m. long or more, with long internodes and geniculate, swollen, conspicuously villous nodes; culms compressed, 20 to 80 cm. tall; blades mostly elongate, 2 to 7 mm. wide, glabrous or nearly so; panicles 3 to 12 cm. long, about 1 cm. wide; spikelets 3 to 3.8 mm. long, obovoid, brownish, obtuse; first glume nearly as long as the spikelet. 2 —Sandy or gravelly soil, mostly along banks

of rivers, arroyos, and irrigation ditches, western Missouri to Colorado, south to Arkansas, Texas, Utah, and Arizona; Mexico.

16. Hemítoma.—Aquatic or subaquatic perennial; panicles elongate, very narrow; spikelets subsessile, 3- to 5-nerved, glabrous.

169. *Panicum hemítomon* Schult. MAIDENCANE. (Fig. 1078.) With extensively creeping rhizomes, often producing numerous sterile shoots with overlapping, sometimes densely hirsute, sheaths; culms 50 to 150 cm. tall, usually hard; sheaths of fertile culms usually glabrous; blades 10 to 25 cm. long, 7 to 15 mm. wide, usually scabrous on the upper surface and smooth beneath; panicle 15 to 30 cm. long, the branches erect, the lower distant, the upper approximate, 2 to 10 cm. long; spikelets 2.4 to 2.7 mm. long, lanceolate, acute; first glume about half the length of the spikelet; fruit less rigid than usual in the genus, the apex of the palea scarcely enclosed. 2 —Moist soil along river banks and ditches, borders of lakes and ponds, often in the water, sometimes a weed in moist cultivated

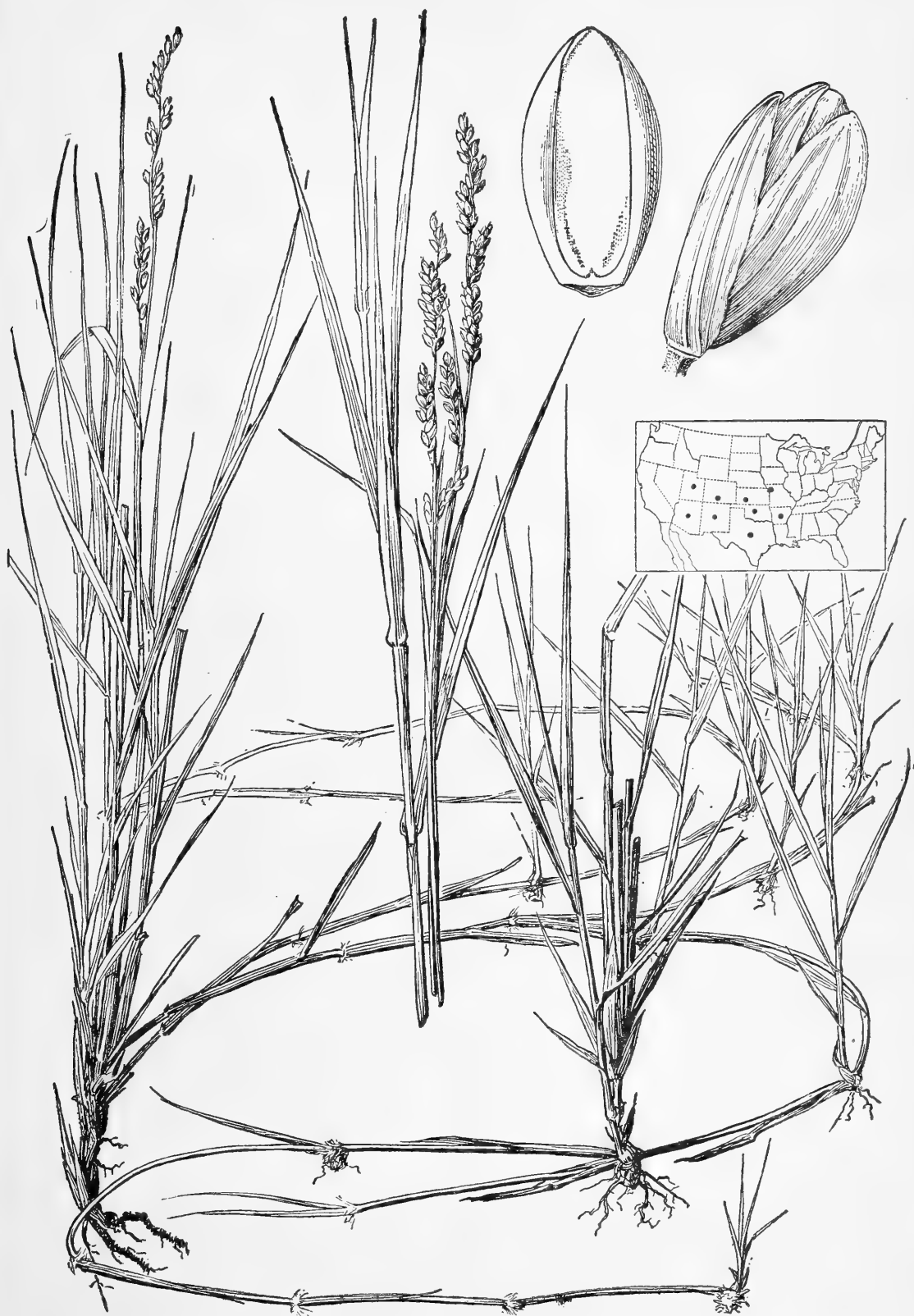


FIGURE 1077.—*Panicum obtusum*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 10$. (Hitchcock 13412, Tex.)



FIGURE 1078.—*Panicum hemitomon*. Panicle, $\times 1$; spikelet and floret, $\times 10$. (Tracy 6731, Fla.)

fields, Coastal Plain, New Jersey to Florida and Texas; Tennessee; Brazil.

17. *Gymnocarpa*.—Succulent glabrous perennial; panicles of several to many long stiffly ascending racemes along a main axis; spikelets strongly 3- to 5-nerved, glabrous.

170. *Panicum gymnocarpon* Ell. (Fig. 1079.) Creeping, the base as much as 2 m. long, rooting at the nodes; culms 60 to 100 cm. tall; blades elongate, 15 to 25 mm. wide, flat, scarcely narrowed at the cordate, sparingly ciliate base, the margin very scabrous; panicle 20 to 40 cm. long; spikelets 6 to 7 mm. long; first glume nearly as long as the sterile lemma, the second glume exceeding the sterile lemma, all acuminate-pointed, much exceeding the obovate, stipitate fruit, this 2 mm. long, smooth and shining. \varnothing —Ditches and muddy banks of streams and lakes, South Carolina to Florida, Arkansas, and Texas.

Panicum antidotale Retz. Robust glabrous, branching, leafy perennial, to 3 m. tall, with strong rhizomes; blades elongate, flat, 5 to 12 mm. wide; panicle 20 to 30 cm. long, the many-flowered branches ascending; spikelets 2.5 to 3 mm. long, strongly

nerved, pointed, the first glume one-third to scarcely half as long as the spikelet. \varnothing —Cultivated in experiment stations in Missouri, Texas, Oklahoma, Arizona (spreading in Cochise County), and California. India

138. *Lasiacis* (Griseb.) Hitch

Spikelets subglobose, placed obliquely on their pedicels; first glume broad, somewhat inflated-ventricose, usually not more than one-third the length of the spikelet, several-nerved; second glume and sterile lemma about equal, broad, abruptly apiculate, papery-chartaceous, shining, many-nerved, glabrous, or lanose at the apex only, the lemma enclosing a membranaceous palea and sometimes a staminate flower; fertile lemma white, bony-indurate, obovoid, obtuse, this and the palea of the same texture, bearing at the apex in a slight depression a tuft of woolly hairs, the palea concave below, gibbous above, the apex often free at maturity. Large branching peren-

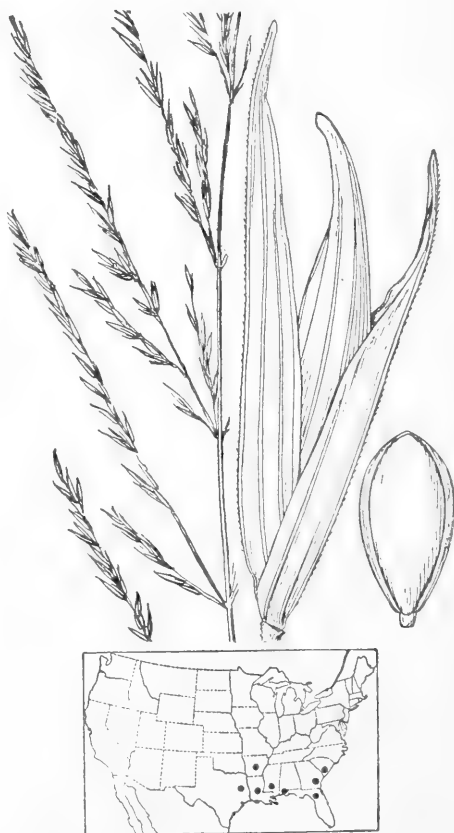


FIGURE 1079.—*Panicum gymnocarpon*. Panicle, $\times 1$; spikelet and floret, $\times 10$. (Type.)



FIGURE 1080.—*Lasiacis divaricata*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 10$. (Curtiss 5530, Fla.)

nials, with woody culms often clam-bering several meters high into shrubs or trees, the blades firm, flat, usually lanceolate and narrowed into a petiole, the spikelets in an open panicle. Type species, *Lasiacis divaricata*. Name from Greek *lasios*, woolly, and *akis*, point, alluding to the tuft of wool at the tip of the fruit.

1. *Lasiacis divaricata* (L.) Hitchc. TIBISEE. (Fig. 1080.) Glabrous

throughout except the margins of the sheaths; culms much-branched, clampering over shrubs to the height of 3 or 4 m., the main culm (cane) strong, as much as 6 mm. in diameter, the main branches often fascicled, the vigorous secondary sterile shoots usually strongly divaricate or zigzag; blades narrowly lanceolate, 5 to 20 cm. long, 5 to 15 mm. wide, or larger on vigorous sterile shoots; panicles

terminating the main culm and branches, 5 to 20 cm. long, loosely few-flowered, the branches distant, spreading or reflexed; spikelets ovoid, about 4 mm. long, black at maturity.

21 —Copses and edges of woods,

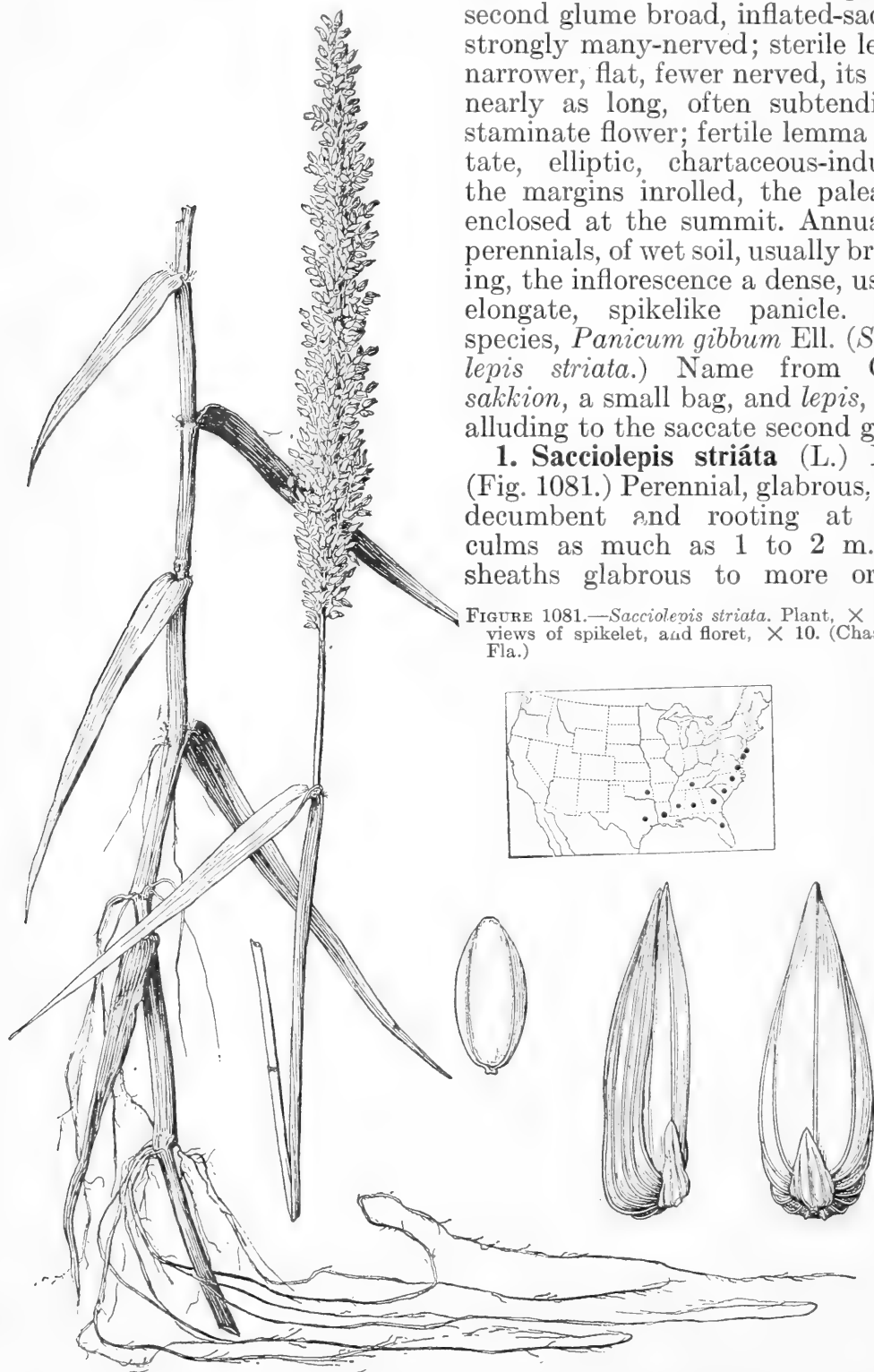
southern Florida; tropical America, at low altitudes, especially near the seacoast.

139. SACCIÓLEPIS Nash

Spikelets oblong-conic; first glume much shorter than the spikelet; second glume broad, inflated-saccate, strongly many-nerved; sterile lemma narrower, flat, fewer nerved, its palea nearly as long, often subtending a staminate flower; fertile lemma stipitate, elliptic, chartaceous-indurate, the margins inrolled, the palea not enclosed at the summit. Annuals or perennials, of wet soil, usually branching, the inflorescence a dense, usually elongate, spikelike panicle. Type species, *Panicum gibbum* Ell. (*Sacciolepis striata*.) Name from Greek *sakkion*, a small bag, and *lepis*, scale, alluding to the saccate second glume.

1. *Sacciolepis striata* (L.) Nash. (Fig. 1081.) Perennial, glabrous, often decumbent and rooting at base; culms as much as 1 to 2 m. tall; sheaths glabrous to more or less

FIGURE 1081.—*Sacciolepis striata*. Plant, $\times \frac{1}{2}$; two views of spikelet, and floret, $\times 10$. (Chase 4240, Fla.)



papillose-hirsute; blades lanceolate, 4 to 20 cm. long; panicles 6 to 30 cm. long; spikelets about 4 mm. long. 2l (*Sacciolepis gibba* Nash.)—Marshes,

ditches, and wet places, Coastal Plain, New Jersey (Cape May) to Florida; Tennessee, Texas, and Oklahoma; West Indies.

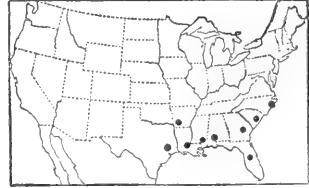


FIGURE 1082.—*Oplismenus setarius*. Plant, $\times \frac{1}{2}$; two views of spikelet, and floret, $\times 10$. (Curtiss 5553, Fla.)

Sacciolepis indica (L.) Chase. Annual; culms slender, spreading, 20 to 60 cm. tall; blades 2 to 4 mm. wide; panicle spikelike, 1 to 4 cm. long;

spikelets about 2.5 mm. long, glabrous or pilose near the summit. 2 —Introduced in a Government pecan orchard, Thomasville, Ga.; India.

140. OPLISMENUS Beauv.

Spikelets terete or somewhat laterally compressed, subsessile, solitary or in pairs, in 2 rows crowded or approximate on one side of a narrow scabrous or hairy rachis; glumes about equal, entire, or emarginate, awned from the apex or from between the lobes; sterile lemma exceeding the glumes and fruit, notched or entire, mucronate or short-awned, enclosing a hyaline palea; fertile lemma elliptic, acute, convex or boat-shaped, the firm margins clasping the palea, not inrolled. Freely branching, creeping, shade-loving annuals or perennials, with erect flowering shoots, flat, thin, lanceolate or ovate blades, and several one-sided, thickish, short racemes rather distant on a slender axis. Type species, *Oplismenus africanus* Beauv. Name from Greek *hoplismenos*, armed, alluding to the awned spikelets.

Rachis of racemes mostly 2 to 3 mm. long, bearing usually not more than 5 spikelets; blades 1 to 3 cm. long.

Rachis of lower racemes 10 to 30 mm. long, bearing more than 8 spikelets; blades mostly 5 cm. or more long.

1. O. SETARIUS.

2. O. HIRTELLUS.

1. *Oplismenus setarius* (Lam.)

Roem. and Schult. (Fig. 1082.) Perennial; culms slender, lax, ascending or prostrate, 10 to 20 cm. long, sometimes as much as 30 cm.; blades ovate to ovate-lanceolate, thin, 1 to 3 cm. long, 4 to 10 mm. wide; panicle long-exserted, usually not more than 5 cm. long; racemes usually 3 to 5, subglobose, distant or the upper approximate, the lower internodes sometimes as much as 2 cm. long, the rachis 2 to 3 mm. long, sometimes to 6 mm.; spikelets about 5 (4 to 8) on each rachis; awn of first glume 4 to 8 mm. long. 2 —Shaded places along the coast, North Carolina to Florida, Arkansas, and Texas; tropical America at low altitudes.

2. *Oplismenus hirtellus* (L.) Beauv.

(Fig. 1083.) Perennial; culms widely creeping and branching, the fertile culms erect from an ascending base, commonly 20 to 30 cm. tall; sheaths glabrous to papillose-hispid; blades 5 to 10 cm. long, 1 to 2 cm. wide; panicle 5 to 10 cm. long; racemes 3 to 7, rather distant, the rachis 1 to 3 cm. long, the spikelets green with erect purple awns, the awn of the



FIGURE 1083.—*Oplismenus hirtellus*, $\times \frac{1}{2}$. (Amer. Gr. Natl. Herb. 602, Trinidad.)

first glume 5 to 10 mm. long. 2 — Shady places, Texas (Cameron County); Mexico, and the West Indies to Argentina. Sometimes cultivated by florists as a basket plant and for edging, under the name *Panicum variegatum*. It has been incorrectly referred to *Oplismenus burmanni* (Retz.) Beauv. The common form in cultivation is variegated, the blades striped with white.

141. ECHINÓCHLOA Beauv.

Spikelets planoconvex, often stiffly hispid, subsessile, solitary or in irregular clusters on one side of the panicle branches; first glume about half the length of the spikelet, pointed; second glume and sterile lemma equal, pointed, mucronate, or the glume short-awned and the lemma long-awned, sometimes conspicuously so, enclosing a membranaceous palea and sometimes a staminate flower; fertile lemma planoconvex, smooth and shining, acuminate-pointed, the margins inrolled below, flat above, the apex of the palea not enclosed. Coarse, often succulent, annuals or perennials, with compressed sheaths, linear flat blades, and rather compact panicles composed of short, densely flowered racemes along a main axis. Type species, *Echinochloa crusgalli*. Name from Greek *echinos*, hedgehog, and *chloa*, grass, alluding to the echinate spikelets.

All the species are grazed by stock but usually grow in sparse stands or in situations where they cannot well be utilized. *E. crusgalli* is occasionally cut for hay. *Echinochloa crusgalli* var. *frumentacea*, Japanese millet, has been advertised by seedsmen in this country as billion-dollar grass and recommended for forage. It has some forage value, but requires considerable moisture to produce abundantly, and is rather too succulent for hay. This and forms of *E. colonum* are cultivated in tropical Asia and tropical Africa for the seeds which are used for food.

Ligule a dense line of stiff yellowish hairs; plants perennial..... 1. *E. POLYSTACHYA*.
Ligule wanting; plants annual.

Racemes simple, rather distant, 1 to 2 cm. long; spikelets crowded in about 4 rows, the awn of the sterile lemma reduced to a short point; blades 3 to 6 mm. wide.

2. *E. COLONUM*.

Racemes more or less branched, usually more than 2 cm. long; spikelets irregularly crowded and fascicled, usually not arranged in rows, the awn of the sterile lemma variable; blades usually more than 5 mm. wide.

Sterile floret staminate..... 5. *E. PALUDIGENA*.

Sterile floret neuter.

Sheaths smooth; awns variable, but the panicle not a dense mass of long-awned spikelets.

Panicles erect and rather stiff (heavy panicles somewhat nodding); spikelets conspicuously hispid..... 3. *E. CRUSGALLI*.

Panicles soft and nodding; spikelets inconspicuously hispid.

4. *E. CRUS-PAVONIS*.

Sheaths, at least the lower, hispid or scabrous (glabrous in forma *laevigata*); panicle dense, the spikelets long-awned..... 6. *E. WALTERI*.

1. *Echinochloa polystachya* (H. B. K.) Hitchc. (Fig. 1084.) Aquatic or subaquatic; culms coarse, 1 to 2 m. tall, from a long creeping base, glabrous; nodes glabrous or obscurely pubescent; sheaths glabrous or very sparsely papillose; ligule a dense line of stiff yellow hairs as much as 4 mm. long; blades 30 to 40 cm. long, 1.5 to 2.5 cm. wide, scabrous on the margin; panicles mostly 15 to 25 cm. long, dense, the short thick branches ascending; pedicels with stiff hairs 3 to 5 mm. long; spikelets about 5 mm. long, the nerves papillose-hispid, the sterile floret staminate; awns 2 to

15 mm. long. 2 —Swamps and ditches near the coast, Louisiana and Brownsville, Tex.; West Indies to Argentina.

2. *Echinochloa colónum* (L.) Link. JUNGLE-RICE. (Fig. 1085.) Culms prostrate to erect, 20 to 40 cm. long; blades rather lax, 3 to 6 mm. wide, occasionally transversely zoned with purple; panicle 5 to 15 cm. long; racemes several, 1 to 2 cm. long, appressed or ascending, single or occasionally two approximate, the lower usually distant as much as 1 cm.; spikelets about 3 mm. long,



FIGURE 1084.—*Echinochloa polystachya*, $\times 1$. (Chase 6319, P. R.)



FIGURE 1085.—*Echinochloa colonum*, $\times 1$. (Bentley, Tex.)

crowded, nearly sessile; second glume and sterile lemma short-pointed, rather soft, faintly nerved, the nerves weakly hispid-scabrous. ☉ — Ditches and moist places, Virginia to Missouri, south to Florida, Texas, and southeastern California; ballast, Camden, N. J., Philadelphia, Pa., and Portland, Oreg.; tropical regions of both hemispheres; introduced in America.

3. *Echinochloa crusgalli* (L.)

Beauv. BARNYARD GRASS. (Fig. 1086.) Culms erect to decumbent, stout, as much as 1 m. or even 1.5 m. tall, often branching at base; sheaths glabrous; blades elongate, 5 to 15 mm. wide; panicle erect or nodding, purple-tinged, 10 to 20 cm. long; racemes spreading; ascending or appressed, the lower somewhat distant, as much as 10 cm. long, sometimes branched, the upper approximate; spikelets crowded, about 3 mm. long, excluding the awns; internerves hispidulous; nerves strongly tuberculate-hispid; awn variable, mostly 5 to 10 mm. long on at least some of the spikelets, sometimes as much as 3 cm. ☉ — Moist open places, ditches, cultivated fields, and waste ground, New Brunswick to Washington, south to Florida and California, mostly at low and medium altitudes; Eastern Hemisphere. *Echinochloa pungens* (Poir.) Rydb. (*E. muricata* (Michx.) Fernald) has been differentiated from *E. crusgalli* by the papillae at the base of the stiff hairs on the spikelets; true *E. crusgalli*, as understood by Fernald and by Rydberg, having hairs that lack the papillose base. But the European specimens have on the average about as strongly tuberculate spikelets as the American. The three following varieties intergrade and can sometimes be only arbitrarily distinguished.¹⁴

¹⁴For various treatments of the *Echinochloa crusgalli* complex, and for names here cited in Synonymy see FERNALD, F. L., *Rhodora* 17: 105-107. 1915; FERNALD, F. L. and GRISCOM, L., *Rhodora* 37: 136-137. 1935. WIEGAND, K. M., 23: 49-65. 1921. For FARWELL, FASSETT, GLEASON, RYDBERG, and others, see references in Synonymy.



FIGURE 1086.—*Echinochloa crusgalli*. Plant, $\times \frac{1}{2}$; two views of spikelet, and floret, $\times 10$. (Somes 3725, Iowa.)



FIGURE 1087.—*Echinochloa crusgalli* var. *mitis*, $\times 1$.
(Pammel and Cratty 791, Iowa.)

ECHINOCHLOA CRUSGALLI var. *MÍTIS* (Pursh) Peterm. (Fig. 1087.) Racemes dense, mostly somewhat spreading-flexuous; spikelets awnless or nearly so, the awns less than 3 mm. long; basal sheaths occasionally hirsute. ☉ —Moist places over about the same area as the species and nearly as common.

ECHINOCHLOA CRUSGALLI var. *ZELAYÉNSIS* (H. B. K.) Hitchc. (Fig. 1088.) Differs from *E. crusgalli* var. *mitis* in having less succulent culms, mostly simple, more or less appressed racemes, the spikelets less strongly hispid but papillose, usually green. Small plants resemble *E. colonum*, but differ in the more distinctly pointed spikelets, more spreading racemes, and erect more robust culms. ☉ —Moist, often alkaline places, Oklahoma to Oregon, south to Texas and California; Mexico to Argentina, in the tablelands. (Type from Zelaya, Mexico.)

ECHINOCHLOA CRUSGALLI var. *FRUMENTÁCEA* (Roxb.) W. F. Wight. JAPANESE MILLET. (Fig. 1089.) Ra-



FIGURE 1088.—*Echinochloa crusgalli* var. *zelayensis*, $\times 1$. (Mearns 744, Mex.)



FIGURE 1089.—*Echinochloa crusgalli* var. *frumentacea*, $\times 1$. (Piper, Tex.)

cemes thick, appressed, incurved; spikelets more turgid, awnless, mostly purple, the nerves hispid, but not, or only slightly, tuberculate. ☉ (Var. *edulis* Hitchc.)—Occasionally cultivated as a forage grass and escaped here and there. Exploited at one time under the name, "billion-dollar grass."

4. *Echinochloa crus-pavonis* (H. B. K.) Schult. (Fig. 1090.) Culms erect or sometimes decumbent at base, as much as 1 m. tall; blades 5 to 15 mm. wide; panicle 10 to 20 cm. long, nodding, rather soft, pinkish or pale purple; racemes mostly ascending or appressed, the lower somewhat distant; spikelets about 3 mm. long, hispid on the nerves, hispidulous on the internerves, the awn usually about 1 cm. long. ☉ (*E. crusgalli crus-pavonis* Hitchc.)—Marshes and wet places, often in the water, Virginia, Alabama, Louisiana, southern Texas, and through tropical America at low altitudes.

5. *Echinochloa paludigena* Wiegand. (Fig. 1091.) Culms mostly soli-



FIGURE 1091.—*Echinochloa paludigena*, $\times 1$. (Fredholm 6390, Fla.)



FIGURE 1090.—*Echinochloa crus-pavonis*, $\times 1$. (Sintenis 1889, P. R.)

tary, erect, rather stout, usually 1 to 1.5 m. tall; blades elongate, 8 to 20 mm. wide; panicle narrow, usually 20 to 30 cm. long; racemes ascending, usually simple, rather evenly distributed on the axis, not closely crowded, sometimes remote; spikelets about as in *E. crusgalli*, but on the average less strongly tuberculate; sterile floret staminate. ☉ — Ditches, marshes, and wet places, often in shallow water, south and central Florida.

6. *Echinochloa waltéri* (Pursh) Heller. (Fig. 1092.) Culms usually stout, erect, 1 to 2 m. tall; sheaths papillose-hispid or papillose only, sometimes only the lower sheaths hispid or the hairs on the margins only; blades elongate; panicle dense, nodding, mostly 20 to 30 cm. long, purplish; spikelets about 4 mm. long, less turgid than in *E. crusgalli*; the

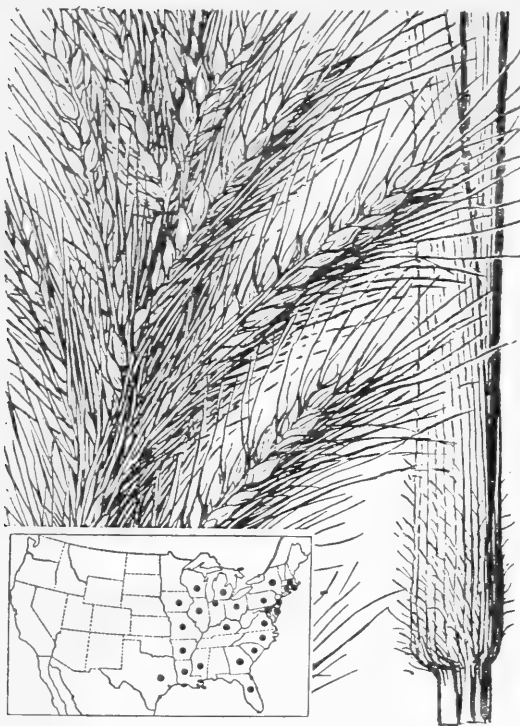


FIGURE 1092.—*Echinochloa walteri*, $\times 1$. (Chase 1426, Ill.)

stiff hairs on the nerves not tuberculate; awns mostly 1 to 2.5 cm. long. ☉ —Wet places, often in shallow water or brackish marshes, Coastal Plain, Massachusetts to Florida and Texas; Wisconsin, Iowa, and Arkansas. Short-awned specimens have been segregated as forma *brevisetata* Fern. and Griseb. *ECHINOCHLOA WALTERI* forma *LAÉVIGATA* Wiegand. Sheaths glabrous. (*E. longearistata* Nash.) Wisconsin, Virginia, South Carolina, Arkansas, Louisiana, and Texas.

142. RHYNCHELYTRUM Nees

(Included in *Tricholaena* Schrad. in Manual, ed. 1)

Spikelets on short capillary pedicels; first glume minute, villous; second glume and sterile lemma equal, gibbous below, raised on a stipe above the first glume, emarginate or slightly lobed, short-awned, covered, except toward the slightly spreading apex, with long silky hairs, the palea of the sterile lemma well developed; fertile lemma shorter than the spikelet, cartilaginous, smooth, boat-shaped, ob-

tuse, the margin thin, not inrolled, enclosing the margins of the palea. Perennials or annuals, with rather open panicles of silky spikelets, the fruit not falling from the spikelet at maturity. Type species *Rhynchelytrum dregeanum* Nees. Name from Greek, *rhychos*, beak, and *elytron*, scale, alluding to the beaked second glume and sterile lemma. This genus has, until recently, generally been included in *Tricholaena* Schrad. The type species of the two are sufficiently different to recognize this as generically distinct.

1. *Rhynchelytrum róseum* (Nees) Stapf and Hubb. NATAL GRASS. (Fig. 1093.) Short-lived perennial, sometimes apparently annual; culms slender, about 1 m. tall; blades flat, 2 to 5 mm. wide; panicle rosy purple, fading to pink, silvery in age, 10 to 15 cm. long, the branches slender, ascending; spikelets about 5 mm. long, the capillary pedicels flexuous or recurved. ☉ (*Tricholaena rosea* Nees.)—Sandy prairies, open woods, fields, and waste places, Florida, Texas, and Arizona, naturalized from South Africa; drier parts of tropical America at low altitudes. Cultivated as a meadow grass in sandy soil in Florida and more rarely along the Gulf coast.

CORIDÓCHLOA Nees

Spikelets flattened, ovate, in 2's or 3's, subsessile along a slender rachis; glumes and sterile lemma papery, the second glume stiffly ciliate; fruit stipitate, concavo-convex, awned. Annual, with several digitate racemes naked at base.

***Coridochloa cimicína* (L.) Nees ex Jacks.** Culms 20 to 60 cm. tall; sheaths hispid; blades 3 to 8 cm. long, 1.5 to 2.5 cm. wide, subcordate; racemes mostly 4 to 8, digitate, sometimes a second whorl below; spikelets about 3 mm. long, the awn of the fruit curved, about 1 mm. long. ☉ —Sparingly introduced in Florida. Southern Asia.



FIGURE 1093.—*Rhynchelythrum roseum*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 10$. (Tracy 9365, Fla.)

143. SETÁRIA Beauv.

(Chaetochloa Scribn.)

Spikelets subtended by one to several bristles (sterile branchlets), falling free from the bristles, awnless; first glume broad, usually less than half the length of the spikelet, 3- to 5-nerved; second glume and sterile lemma equal, or the glume shorter, several-nerved; fertile lemma coriaceous-indurate, transversely rugose or smooth. Annual or perennial grasses, with narrow terminal panicles, these dense and spikelike or somewhat loose and open. Type species, *Setaria viridis*. Name from Latin *seta*, a bristle, alluding to the numerous bristles of the inflorescence. The species are, in general, palatable and nutritious. A few species, especially *S. macrostachya*, form an appreciable part of the forage on southwestern ranges. Primitive peoples have cultivated *S. italica*, Italian or foxtail millet, since prehistoric times. The seed has been found in early remains such as those of the Swiss lake dwellings of the stone age. In America this species is used for hay. Another species, *S. palmifolia*, is cultivated for ornament in greenhouses.

Bristles below each spikelet numerous, at least more than 5. Panicle dense, cylindric, spike-like.

Plants annual; spikelets 3 mm. long; lower floret staminate, the palea well developed.

1. *S. LUTESCENS*.

Plants perennial; spikelets 2 to 2.5 mm. long; lower floret neuter, the palea reduced.

2. *S. GENICULATA*.

Bristles below each spikelet 1 to 3, or, by the abortion of the spikelets, 4 or 6. (See also *S. faberii*.)

Bristles more or less retrorsely scabrous (antrorsely in var. *ambigua*).

3. *S. VERTICILLATA*.

Bristles antrorsely scabrous only.

Plants perennial.

Spikelets 3 mm. long.

Blades scabrous..... 4. *S. MACROSPERMA*.

Blades villous..... 5. *S. VILLOSISSIMA*.

Spikelets 2 to 2.5 mm. long.

Blades mostly less than 1 cm. wide, often folded; panicles usually loosely or interruptedly spikelike, the branches usually not more than 1 cm. long.

6. *S. MACROSTACHYA*.

Blades flat, as much as 1.5 cm. wide; panicles tapering from near the base, the lower branches as much as 3 cm. long..... 7. *S. SCHEELEI*.

Plants annual.

Fertile lemma coarsely transversely rugose.

Panicle densely cylindric..... 8. *S. CORRUGATA*.

Panicle loosely flowered..... 9. *S. LIEBMANNI*.

Fertile lemma finely cross-lined or nearly smooth.

Panicle loosely flowered, tapering above..... 10. *S. GRISEBACHII*.

Panicle compactly flowered, sometimes interrupted at base.

Culms as much as 3 m. tall; bristles 1 to 2 cm. long; fertile lemma smooth or nearly so..... 11. *S. MAGNA*.

Culms mostly less than 1 m. tall.

Panicle cylindric, tapering above, green; spikelets falling entire.

Spikelets 2 to 2.5 mm. long; bristles 1 to 3 below each spikelet; panicle erect or somewhat nodding..... 12. *S. VIRIDIS*.

Spikelets 2.8 to 3 mm. long; bristles 3 to 6 below each spikelet; panicle conspicuously nodding..... 13. *S. FABERII*.

Panicle lobed or interrupted, often large and heavy, purple or yellow; fruit deciduous from glumes and sterile lemma..... 14. *S. ITALICA*.

1. *Setaria lutescens* (Weigel)

Hubb. YELLOW BRISTLEGRASS. (Fig. 1094.) Annual, branching at base; culms erect to prostrate, mostly 50 to 100 cm. tall, compressed; sheaths keeled; blades as much as 25 cm. long

and 1 cm. wide, flat, twisted in a loose spiral, villous toward the base above; panicle dense, evenly cylindric, spike-like, yellow at maturity, mostly 5 to 10 cm. long, about 1 cm. thick, the

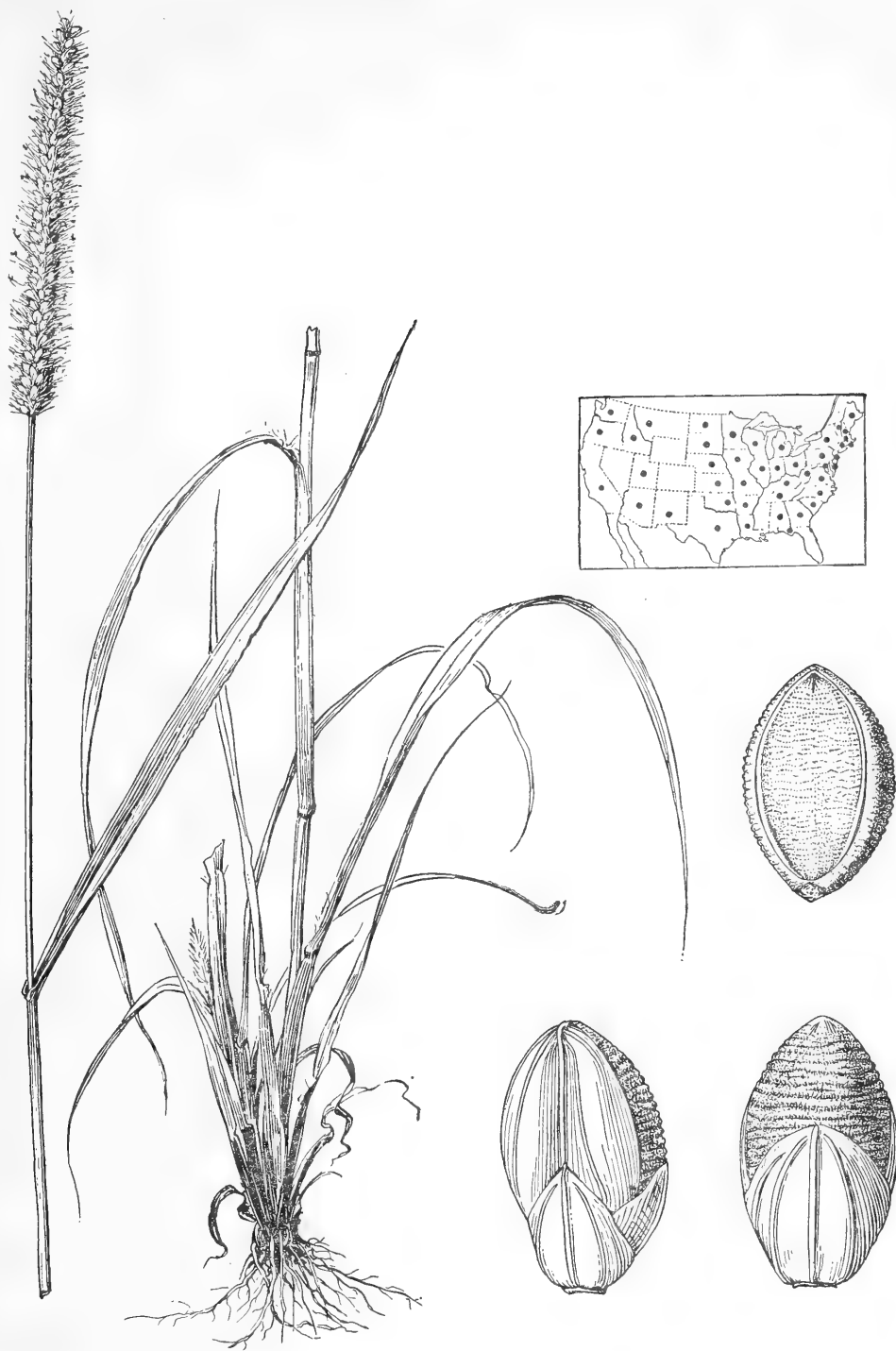


FIGURE 1094.—*Setaria lutescens*. Plant, $\times \frac{1}{2}$; two views of spikelet, and floret, $\times 10$. (Chase 2986, D. C.)

axis densely pubescent; bristles 5 to 20 in a cluster, the longer 2 to 3 times as long as the spikelet; spikelets 3 mm. long; fruit strongly rugose. ☉
—Cultivated soil and waste places, New Brunswick to North Dakota, south to northern Florida and Texas,

occasional from British Columbia to California, New Mexico, and Arizona; Jamaica, at high altitudes; introduced from Europe; widely distributed in temperate regions. This species has been erroneously referred to *S. glauca* (L.) Beauv.



FIGURE 1095.—*Setaria geniculata*, $\times 1$. (Chase 2981, Md.)



FIGURE 1096.—*Setaria verticillata*, $\times 1$. (Steele, D. C.)

2. *Setaria geniculata* (Lam.)

Beauv. KNOTROOT BRISTLEGRASS. (Fig. 1095.) Resembling *S. lutescens* but perennial, producing short knotty branching rhizomes as much as 4 cm. long; base of plant slender, wiry; blades mainly straight (not twisted as in *S. lutescens*); bristles yellow or purple, 1 to 3 times or even 6 times as long as the spikelet; spikelets 2 to 2.5 or even 3 mm. long. ♀ —Open ground, pastures, cultivated soil, salt marshes, and moist ground along the coast, Massachusetts to Florida and Texas, in the interior north to West Virginia, Illinois, and Kansas, west to California; tropical America to Argentina and Chile.

Setaria nigriróstris (Nees) Dur. and Schinz. Perennial; resembling *S. lutescens*, but the dense spikelike racemes purple or dark brown. ♀ —Ballast, near Portland, Oreg.; South Africa.

SETARIA SPHACELÁTA (Schum.) Stapf and C. E. Hubb. Tufted perennial, glabrous or nearly so, often with stout rhizomes; culms 0.5 to 1.5 m. tall, flattened; blades flat, rather lax, 4 to 10 mm. wide; panicle dense, cylindric, 8 to 15 cm. long, usually orange to purple, bristles mostly 5 or more, 3 to 6 mm. long; spikelets 2.5 to 3 mm. long; fruit finely rugose. ♀ —Cultivated in experiment stations and escaped along irrigation ditches, Stanislaus and Kern Counties, Calif. Introduced from Africa.

3. *Setaria verticillata* (L.) Beauv.

BUR BRISTLEGRASS. (Fig. 1096.) Annual, often much branched at base and geniculate-spreading, as much as 1 m. long; blades flat, rather thin, scabrous and often more or less pilose, 10 to 20 cm. long, 5 to 10 mm. wide; panicle erect but not stiff, cylindric or somewhat tapering upward, more or less lobed or interrupted, especially toward base, 5 to 15 cm. long, 7 to 15 mm. wide; bristles single below each spikelet, 1 to 3 times as long as the spikelet, retrorsely scabrous; spikelets 2 mm. long; fruit finely rugose. ♂ —Cultivated soil and waste places, Massachusetts to North Dakota, south to Alabama, Louisiana, and Missouri, occasional west to

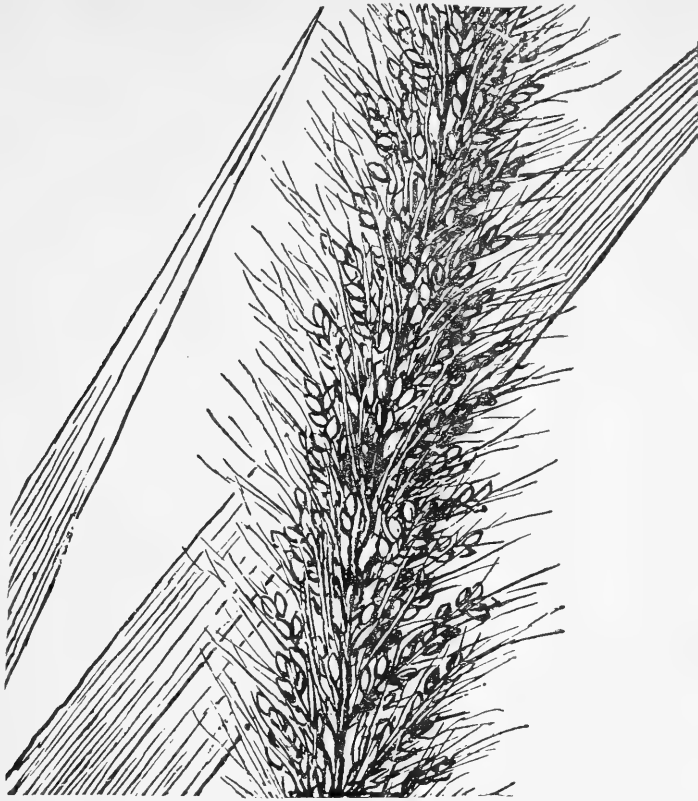


FIGURE 1097.—*Setaria macrosperma*, $\times 1$. (Curtiss 3617, Fla.)

California; introduced from Europe; tropical America at medium altitudes.

SETARIA VERTICILLATA var. **AMBÍGUA** (Guss.) Parl. Differing from *S. verticillata* in the scabrous but not pilose axis of the panicle and the antrorsely scabrous bristles, mostly 2 to 3 times as long as the spikelets, at maturity spreading and more or less implicate. ☉ —Sparingly introduced in the United States, ballast, and waste places, Albany, N. Y., Philadelphia, District of Columbia, and Mobile, Ala.; Europe.

Setaria cárnei Hitchc. Resembling *S. verticillata* (L.) Beauv., but having looser panicles and larger spikelets, brown at maturity. ☉ —A rapidly spreading weed in vineyards, Fresno County, Calif.; introduced from Western Australia.

4. Setaria macrosperma (Scribn. and Merr.) Schum. (Fig. 1097.) Perennial, often in large tufts, 1 to 1.5 m. tall; sheaths keeled; blades elongate, 1 to 2 cm. wide, scabrous on upper surface; panicle 15 to 30 cm. long, 2 to 4 cm. wide, tapering to both ends,

rather loose, the secondary panicles smaller, compact, the branches of the terminal panicle as much as 2 cm. long, about equally distributed; bristles single below each spikelet, 1.5 to 3 cm. long; spikelets 3 mm. long. 2 —Open ground, mostly on coral rock or coral sand, Florida; Bahamas.

5. Setaria villosissima (Scribn. and Merr.) Schum. (Fig. 1098.) Perennial, as much as 1 m. tall; blades flat, villous or scabrous only, 15 to 30 cm. long, 5 to 10 mm. wide; panicle rather loose, more or less interrupted, tapering above, as much as 27 cm. long, the branches ascending, the axis villous; bristles 1.5 to 2.5 cm. long; spikelets about 3 mm. long, the second glume slightly shorter; fruit finely rugose. 2 —Open or wooded rocky places, Texas and Arizona (locality unknown). Differing from *S. macrosperma* in the villous blades and looser panicles.

6. Setaria macrostachya H. B. K. PLAINS BRISTLEGRASS. (Fig. 1099.) Perennial, densely tufted, usually pale or glaucous, 40 to 120 cm. tall;

FIGURE 1098.—*Setaria villosissima*, $\times 1$. (Smith, Tex.)

blades flat or folded, scabrous on the upper surface, rarely pubescent on both surfaces, 15 to 40 cm. long, 3 to 10 mm. wide; panicle spikelike, 10 to 25 cm. long, mostly 5 to 10 mm. thick, somewhat tapering but not attenuate, more or less interrupted or lobed; bristles 10 to 15 mm. long; spikelets 2 to 2.5 mm. long, very turgid; fruit rugose. ♀ —Open dry ground and dry woods, Texas to Colorado and Arizona; Mexico. Variable, especially in the thickness of the panicle, sometimes very slender, occasionally to 15 mm. thick. The type, from Mexico, is the robust form with thick panicles.

Setaria setosa (Swartz) Beauv. Panicle interrupted, attenuate at apex. ♀ —Ballast, Camden, N. J., and Key West, Fla.; adventive from the West Indies.

Setaria rariflora Mikan ex Trin. Similar to *S. setosa*, the panicle and blades more slender. ♀ —Mobile,

Ala.; adventive from South America.

7. *Setaria scheelei* (Steud.) Hitchc. (Fig. 1100.) Perennial, 60 to 120 cm. tall; sheaths compressed-keeled, glabrous or more or less hispid, the collar hispid; blades flat, elongate, as much as 1.5 cm. wide, scabrous or more or less pubescent; panicle rather loose, mostly 15 to 20 cm. long, tapering from near the base, the lower branches as much as 3 cm. long, ascending, the axis scabrous-pubescent and rather sparsely villous; bristles 1 to 1.5 cm. long, rather numerous, flexuous; spikelets about 2 mm. long; fruit rugose. ♀ —Open or rocky woods, Texas and Arizona. Differing from *S. macrostachya* in the looser panicle and the longer lower branches.

8. *Setaria corrugata* (Ell.) Schult. (Fig. 1101.) Annual, erect or geniculate-spreading; culms freely branching, as much as 1 m. tall; sheaths scabrous to appressed-hirsute; blades flat, scabrous, as much as 30 cm.

long and 1 cm. wide (commonly less than 5 mm.); panicle dense, cylindric, usually 5 to 10 cm. long, the axis densely hispid-scabrous and also villous; bristles much exceeding the spikelets, sometimes as much as 2 cm. long, green or purple; spikelets 2 mm. long; fruit coarsely rugose. ☉ —Sandy woods, cultivated fields, and waste places, along the coast, North Carolina to Florida and Louisiana; Cuba.

9. *Setaria liebmánni* Fourn. (Fig. 1102.) Annual, branching below, 30 to 100 cm. tall; blades flat, rather thin, 10 to 20 cm. long, 1 to 2 cm. wide, scabrous; panicle loosely flowered, tapering at each end, often nodding, usually 10 to 25 cm. long,



FIGURE 1100.—*Setaria scheelei*, $\times 1$. (Bush 1244, Tex.)



FIGURE 1099.—*Setaria macrostachya*, $\times 1$. (Hitchcock 13605, Tex.)



FIGURE 1101.—*Setaria corrugata*, $\times 1$. (Pollard and Collins 253, Fla.)



FIGURE 1102.—*Setaria liebmanni*, $\times 1$. (Palmer 52, Mex.)



FIGURE 1103.—*Setaria grisebachii*, $\times 1$. (Metcalf 1262, N. Mex.)

from slender to 25 mm. wide; bristles 7 to 15 mm. long; spikelets about 2 mm. long; fruit coarsely and strongly rugose. ☉ —Open sandy or rocky soil, Arizona (Tucson); Mexico to Nicaragua.

10. *Setaria grisebachii* Fourn. GRISEBACH BRISTLEGRASS. (Fig. 1103.) Resembling *S. liebmanni*; blades smaller, panicle branches densely flowered; fruit finely rugose. ☉ —Open ground, often a weed in fields, Texas to Arizona; Mexico.

11. *Setaria magna* Griseb. GIANT BRISTLEGRASS. (Fig. 1104.) Annual, robust, erect; culms sparingly branching, as much as 4 m. tall and 2 cm.



FIGURE 1104.—*Setaria magna*, $\times 1$. (Nash 1279, Fla.)

thick at base; blades flat, scabrous, as much as 50 cm. long and 3.5 cm. wide; panicles densely flowered, nodding, often interrupted at base, tapering at each end, as much as 50 cm. long and 3 cm. thick, those of the branches much smaller; bristles 1 to 2 cm. long; spikelets about 2 mm. long; fruit smooth or nearly so, brown and shining at maturity. ☉ —Marshes and wet places along the coast, New Jersey to Florida; Arkansas and Texas; West Indies.

12. *Setaria viridis* (L.) Beauv. GREEN BRISTLEGRASS. (Fig. 1105.)

Annual, branching at base, sometimes geniculate-spreading, 20 to 40 cm. tall (or even 1 m.); blades flat, usually less than 15 cm. long and 1 cm. wide; panicle erect or somewhat nodding, densely flowered, green or purple, cylindric but tapering a little at the summit, usually less than 10 cm. long; bristles 1 to 3 below each spikelet, mostly 3 to 4 times their length, spikelets 2 to 2.5 mm. long; fruit very finely rugose. ☉ —A weed in cultivated soil and waste places, common throughout the cooler parts of the United States, Newfoundland to British Columbia, south to Florida and California, infrequent in the Southern States and in the mountains; Mexico; introduced from Europe.



FIGURE 1105.—*Setaria viridis*, $\times 1$. (Thompson 129, Kans.)

13. *Setaria faberii* Herm. (Fig. 1106.) Similar to *S. viridis*, usually taller; blades softly pubescent to glabrescent; panicle conspicuously nodding; spikelets about 3 mm. long, the second glume shorter than the more rugose fruit. ☉ —Becoming a weed in waste and cultivated ground, apparently spreading rapidly, New York to Nebraska and Arkansas, North Carolina, Kentucky, and Ten-



FIGURE 1106.—*Setaria faberii*. $\times 1$; floret, $\times 5$. (V. H. Chase 8395, Va.)

nessee. Introduced from China, probably in seed of Chinese millet.

14. *Setaria itálica* (L.) Beauv. Fox-TAIL MILLET. (Fig. 1107.) Cultivated form of *S. viridis*, more robust, with broader blades and larger lobed panicles, the fruit smooth or nearly so, shining at maturity, falling away from the remainder of the spikelet. In the larger forms the culms may be as much as 1 cm. thick and the panicles as much as 30 cm. long and 3 cm. thick, yellow or purple; bristles from scarcely longer than the spikelets to 3 to 4 times as long; fruit tawny to red, brown, or black. The smaller forms are known as Hungarian grass. ☉ —Cultivated in the warmer parts of the United States, especially from Nebraska to Texas; escaped from cultivation in waste

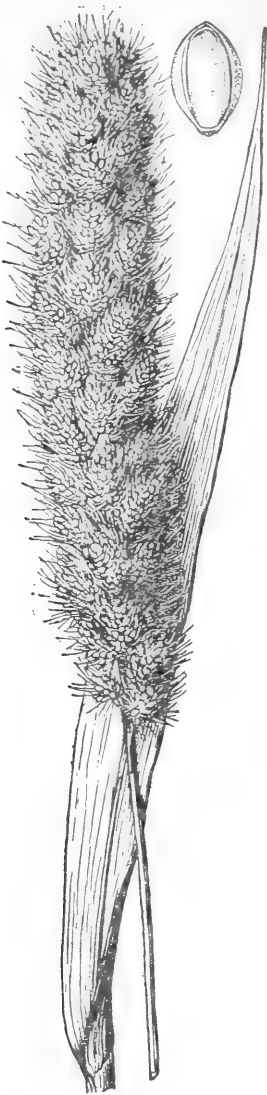


FIGURE 1107.—*Setaria italica*, $\times 1$; floret, $\times 5$.
(Williams 82, D. C.)

places throughout the United States; Eurasia.

Setaria barbáta (Lam.) Kunth. Decumbent annual; blades thin, lightly

plicate, 1 to 2.5 cm. wide; panicles narrow, loose; bristles 5 to 10 mm. long. ☉ —Ballast, Apalachicola and Miami, Fla.; adventive from East Indies. Many cultivated varieties and forms of this species have been described. For a study of these variants and a key to them see Hubbard, F. T., *Rhodora* 2: 187–196. 1915.

SETARIA PALMIFÓLIA (Koen.) Stapf. PALM-GRASS. (Fig. 1108.) Tall perennial; blades plicate, as much as 50 cm. long and 6 cm. wide; panicle loose, 20 to 40 cm. long; bristles inconspicuous. ☉ —Cultivated in the South and in greenhouses for ornament. (Sometimes called *Panicum plicatum*.) Native of India.

SETARIA POIRETIÁNA (Schult.) Kunth. Differing from *S. palmifolia* in having a narrow panicle about 30 cm. long with numerous ascending branches. ☉ —Occasionally cultivated for ornament. (Sometimes called *Panicum sulcatum*.) Tropical America. The last three species belong to the section *Ptychophyllum*.

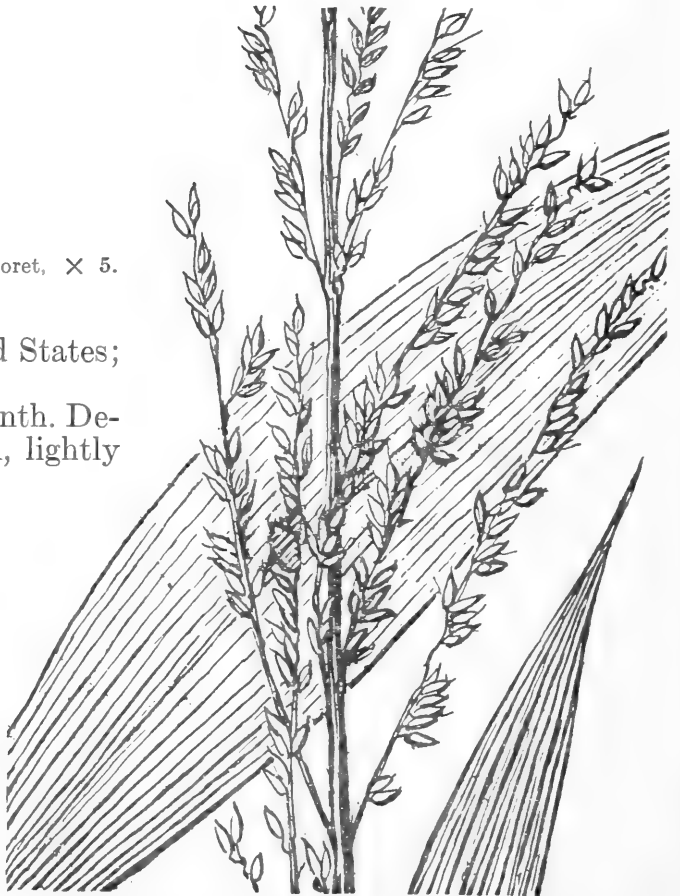


FIGURE 1108.—*Setaria palmifolia*,
 $\times 1$. (Hitchcock 9727, Jamaica.)

144. PENNISÉTUM L. Rich.

Spikelets solitary or in groups of 2 or 3, surrounded by an involucre of bristles (sterile branchlets), these not united except at the very base, often plumose, falling attached to the spikelets; first glume shorter than the spikelet, sometimes minute or wanting; second glume shorter than or equaling the sterile lemma; fertile lemma chartaceous, smooth, the margin thin, enclosing the palea. Annuals or perennials, often branched, with usually flat blades and dense spikelike panicles. Type species, *Pennisetum typhoideum* L. Rich. (*P. glaucum*). Name from Latin *penna*, feather, and *seta*, bristle, alluding to the plumose bristles of some species.

The most important species is *P. glaucum*, pearl millet, which is widely cultivated in tropical Africa and Asia, the seed being used for human food. It has been cultivated since prehistoric times, its wild prototype being unknown. In the United States pearl millet is used to a limited extent in the Southern States for forage, especially for soiling. Two species, *P. villosum* and *P. setaceum*, are cultivated for ornament. An African species, *P. purpureum*, elephant or Napier grass, is used in Florida as a forage plant.

Plants annual; bristles of involucre about as long as the spikelets. Cultivated.

1. *P. GLAUCUM*.

Plants perennial; bristles much longer than the spikelets.

Culms extensively creeping; spikelets few, hidden in the upper sheath.

6. *P. CLANDESTINUM*.

Culms not creeping; panicle exserted.

Longer bristles 1 cm. long.

Bristles unlike, the inner silky, plumose..... 2. *P. SETOSUM*.

Bristles all scabrous..... 3. *P. NERVOSUM*.

Longer bristles 3 to 4 cm. long, the panicles feathery.

Panicle oval, tawny..... 4. *P. VILLOSUM*.

Panicle elongate, purple or rosy..... 5. *P. SETACEUM*.

1. *Pennisetum glaucum* (L.) R.

Br. PEARL MILLET. (Fig. 1109.) Annual; culms robust, as much as 2 m. tall, densely villous below the panicle; blades flat, cordate, sometimes as much as 1 m. long and 5 cm. wide; panicle cylindric, stiff, very dense, as much as 40 to 50 cm. long and 2 to 2.5 cm. thick, pale, bluish-tinged, or sometimes tawny, the stout axis densely villous; fascicles peduncled, spikelets short-pedicel, 2 in a fascicle, 3.5 to 4.5 mm. long, obovate, turgid, the grain at maturity protruding from the hairy-margined lemma and palea. (*P. typhoideum* L. Rich.; *Penicillaria spicata* Willd.)—Cultivated to a limited extent in the Southern States for forage; Eastern Hemisphere.

Pennisetum purpureum Schumach.

NAPIER GRASS. Robust leafy perennial, 2 to 4 m. tall; blades elongate, 2 to 3 cm. wide; panicle dense, elongate, stiff, tawny or purplish,

with sparsely plumose bristles about 1 cm. long. 2 —Introduced from Africa; used as a forage plant from central to southern Florida; grown in the West Indies and South America. Also called elephant grass.

2. *Pennisetum setosum* (Swartz)

L. Rich. (Fig. 1110.) Perennial; culms sometimes 30 or more in loose clumps, 1 to 2 m. tall, geniculate, sometimes rooting at the lower nodes, bearing 1 to several flowering branches from the lower and middle nodes, scabrous below the panicle; blades elongate, 4 to 18 mm. wide; panicle 10 to 25 cm. long, 8 to 10 mm. thick, excluding the bristles, rather dense, yellow to purple; fascicles reflexed at maturity; bristles unequal, the outer delicate, mostly shorter than the spikelet, the inner densely silky-plumose below, as much as 1 cm. long, the hairs beautifully crimped; spikelet solitary, 3.2 to 4 mm. long; fruit subindurate,

smooth and shining. 2 —Open slopes and savannas, southern Florida; tropical America.

3. *Pennisetum nervosum* (Nees) Trin. (Fig. 1111.) Perennial; culms robust, branching, as much as 3 m.

tall; blades elongate, 5 to 10 mm. wide, scabrous; panicle dense, somewhat flexuous, 10 to 20 cm. long; fascicles spreading to reflexed; bristles scabrous, the outer about as long as the spikelet, the inner about 10 mm. long; spikelet solitary, 5 to 6 mm. long. 2 —Moist open or brushy places, Brownsville, Tex., along the Rio Grande; apparently introduced; Ecuador to Brazil and Argentina.

4. *Pennisetum villosum* R. Br. FEATHERTOP. (Fig. 1112.) Perennial; culms tufted, 30 to 60 cm. tall, pubescent below the panicle; blades 3 to 5 mm. wide; panicle tawny, ovoid or oblong, 3 to 10 cm. long, 1 to 5 cm. wide including bristles, dense, feathery; spikelets 1 to 4 in a fascicle; fascicles short-peduncled, a tuft of white hairs at base of peduncle; bristles numerous, spreading, the inner very plumose, the longer 4 to 5 cm. long. 2 (*P. longistylum* of

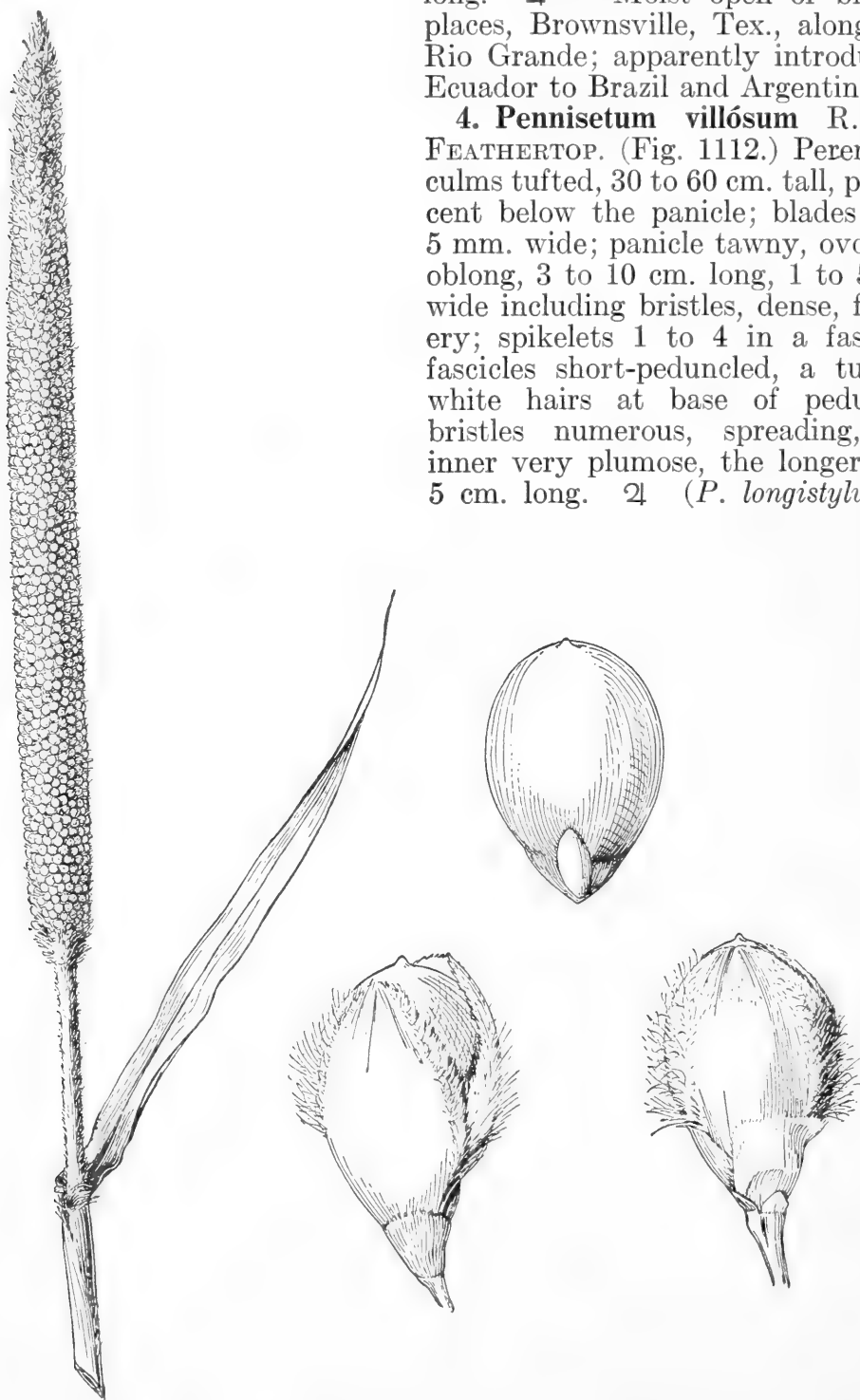


FIGURE 1109.—*Pennisetum glaucum*. Panicle, $\times \frac{1}{2}$; two views of spikelet, and grain, $\times 10$. (McCarthy, N. C.)

florists, not Hochst.)—Cultivated for ornament, sparingly escaped in dry ground, Michigan, Texas, and California; introduced from Africa.

5. *Pennisetum setaceum* (Forsk.) Chiov. FOUNTAIN GRASS. (Fig. 1113.) Perennial, culms tufted, simple, about 1 m. tall; blades narrow, elongate, scabrous; panicle 15 to 35 cm. long, nodding, pink or purple; fascicles peduncled, rather loosely arranged, containing 1 to 3 spikelets; bristles plumose toward base, unequal, the longer 3 to 4 cm. long. 2 (P. *ruppelii* Steud.)—Cultivated for ornament, especially as a border plant or around fountains; introduced from Africa.

6. *Pennisetum clandestinum* Hochst. ex Chiov. KIKUYU GRASS. (Fig. 1114.) Low-growing, rhizomatous, stoloniferous perennial, the stolons with short internodes; inflorescence consisting of 2 to 4 spikelets almost entirely enclosed in the upper sheath of the short culms. 2 — A troublesome weed in orchards and



FIGURE 1111.—*Pennisetum nervosum*, $\times \frac{1}{2}$. (Ferris and Duncan 3198, Tex.)

gardens in southern California. Introduced from Africa. A good forage grass in tropics and subtropics.

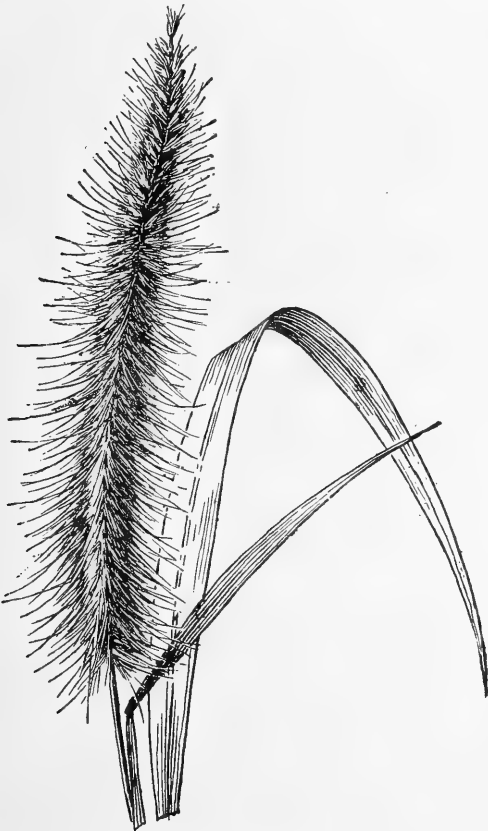


FIGURE 1110.—*Pennisetum setosum*, $\times \frac{1}{2}$. (Amer. Gr. Natl. Herb. 611, Trinidad.)

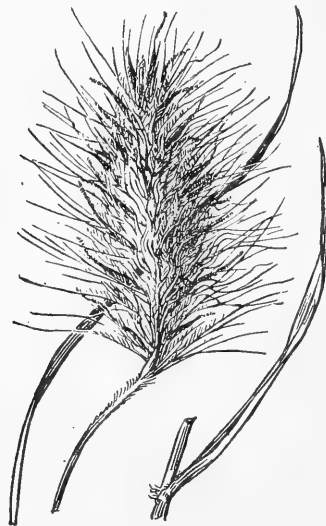


FIGURE 1112.—*Pennisetum villosum*, $\times \frac{1}{2}$. (Eastwood 172, Calif.)

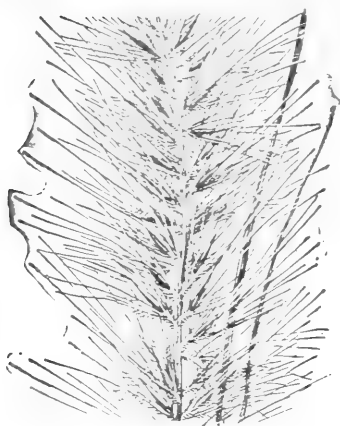


FIGURE 1113.—*Pennisetum setaceum*, $\times \frac{1}{2}$. (Hitchcock, D. C.)

PENNISETUM CILIARE (L.) Link. Culms geniculate, from a knotted crown, 10 to 50 cm. tall; panicle 2 to 10 cm. long; bristles united at the very base, flexuous, purple,

5 to 10 mm. long, the inner plumose. ♀ —Occasionally cultivated in the Southern States; adventive in wool waste, Yonkers, N. Y. In the West Indies said to be good forage. India.

PENNISETUM ALOPECUROIDES (L.) Spreng. Perennial; culms compressed, to 1 m. tall, with elongate scabrous blades and softly bristly panicles 8 to 15 cm. long; bristles of the fascicles to 2 cm. long. ♀ —Sparingly cultivated; escaped in Berks County, Pa.; Asia.

PENNISETUM MACROSTACHYUM (Brongn.) Trin. Resembling *P. setaceum*, blades as much as 2.5 cm. wide; panicle denser, brownish purple, fascicles smaller; bristles not plumose. ♀ —Sparingly cultivated for ornament. East Indies.

PENNISETUM LATIFOLIUM Spreng. Perennial; culms 100 to 150 cm. tall, the nodes appressed-pubescent; blades 2 to 3 cm. wide, tapering to a long point; panicles terminal and axillary, nodding, 5 to 8 cm. long, the bristles prominent. ♀ —Occasionally cultivated for ornament. South America.



FIGURE 1114.—*Pennisetum clandestinum*, $\times 1$. (Chase 10181, Brazil.)

145. CÉNCHRUS L. SANDBUR

Spikelets solitary or few together, surrounded and enclosed by a spiny bur composed of numerous coalescing bristles (sterile branchlets), the bur subglobular, the peduncle short and thick, articulate at base, falling with the spikelets and permanently enclosing them, the seed germinating within the old involucre, the spines usually retrorsely barbed. Annuals or sometimes perennials, commonly low and branching, with flat blades and racemes of

burs, the burs readily deciduous. Type species, *Cenchrus echinatus*. Name from Greek *kegchros*, a kind of millet.

The species are excellent forage grasses before the burs are formed. Several species are weeds and become especially troublesome after the maturity of the burs.

Involucral lobes united at the base only; racemes dense; plants perennial.

1. *C. MYOSUROIDES*.

Involucral lobes united above the base.

Involucre with a ring of slender bristles at base; plants annual.

Burs, excluding the bristles, not more than 4 mm. wide, numerous, crowded in a long raceme; lobes of the involucre interlocking, not spinelike..... 2. *C. BROWNII*.

Burs, excluding the bristles, 5 to 7 mm. wide, not densely crowded; lobes of the involucre erect or nearly so or rarely one or two lobes loosely interlocking, the tips spinelike.

3. *C. ECHINATUS*.

Involucre with flattened spreading spines, no ring of slender bristles at base.

Body of bur ovate, usually not more than 3.5 mm. wide, tapering at base; plants perennial.

Burs glabrous; spines 4 to 6 mm. long..... 4. *C. GRACILLIMUS*.

Burs pubescent; spines rarely more than 4 mm. long, usually shorter.

5. *C. INCERTUS*.

Body of bur globose, 5 mm. wide or more, not tapering at base; plants annual.

Burs, including spines, 7 to 8 mm. wide, finely pubescent..... 6. *C. PAUCIFLORUS*.

Burs, including spines, 10 to 15 mm. wide, densely woolly..... 7. *C. TRIBULOIDES*.

1. *Cenchrus myosuroides* H. B. K. (Fig. 1115.) Stout glaucous woody perennial; culms erect from an often decumbent base, 1 to 1.5 m. tall, branching below; blades 5 to 12 mm. wide; raceme 10 to 25 cm. long, strict, erect, dense; burs 1-flowered, about 5 mm. wide, the bristles united at the base only, the outer shorter, the inner about as long as the spikelet; spikelet 4.5 to 5.5 mm. long. 2 —

Moist sandy open ground or scrubland near the coast, Georgia and Florida, southern Louisiana and southern Texas; tropical America.

***Cenchrus biflorus* Roxb.** Annual; culms 30 to 100 cm. tall; raceme 8 to 10 cm. long, the burs usually 2-flowered, 4 to 6 mm. long, the outer row of bristles short, spreading, the inner flattened, rigid, erect. ☉ (*C. barbatus* Schum., *C. catharticus* Del.) —Ballast, Mobile, Ala.; wool waste, Yonkers, N. Y. Native of India and north Africa.

2. *Cenchrus brownii* Roem. and Schult. (Fig. 1116.) Annual, mostly erect, 30 to 100 cm. tall; blades thin, flat, lax, 6 to 12 mm. wide; raceme 4 to 10 cm. long, dense; burs depressed globose, about 4 mm. high, the outer bristles numerous, very slender, the inner somewhat exceed-

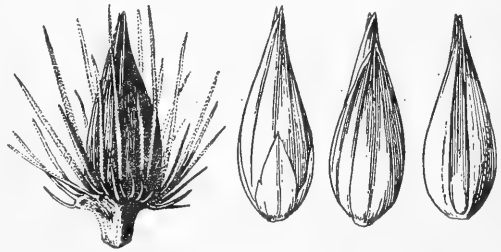


FIGURE 1115.—*Cenchrus myosuroides*. Bur, two views of spikelet, and floret, $\times 5$. (Léon 835, Cuba.)



FIGURE 1116.—*Cenchrus brownii*. Bur, two views of spikelet, and floret, $\times 5$. (Type.)

ing the body, the lobes interlocking at maturity; spikelets usually 3. ☉ (*C. viridis* Spreng.)—Open ground, often a weed in waste places, Florida Keys; adventive in North Carolina; tropical America at low altitudes; introduced in Malaysia.

3. *Cenchrus echinatus* L. (Fig. 1117.) Annual; culms compressed,



FIGURE 1117.—*Cenchrus echinatus*. Bur, two views of spikelet, and floret, $\times 5$. (Hitchcock 9397, Jamaica.)

usually geniculate, branching at base, 25 to 60 cm. long; blades 3 to 8 mm. wide, pilose on the upper surface near the base; raceme 3 to 10 cm. long, the burs larger, fewer, and less crowded than in *C. brownii*; bur 4 to 7 mm. high, as broad or broader, pubescent, the lobes of the involucre erect or

forming dense clumps, glabrous as a whole; culms slender, wiry, erect or ascending, 20 to 80 cm. tall; blades usually folded, 2 to 3 mm. wide; raceme 2 to 6 cm. long, the burs relatively distant, about 3.5, rarely as much as 5 mm., wide (excluding spines), tapering at base, glabrous;



FIGURE 1118.—*Cenchrus gracillimus*. Bur, two views of spikelet, and floret, $\times 5$. (Type coll.)

bent inward but not interlocking; spikelets usually 4 in each bur. ☉ —Open ground and waste places, South Carolina to southern California; a common weed in tropical America; sparingly introduced in Hawaii and Malaysia.

4. *Cenchrus gracillimus* Nash. (Fig. 1118.) Perennial, at length

spines spreading or reflexed, flat, 4 to 6 mm. long, the lobes about 8; spikelets 2 or 3 in each bur. 24 —Sandy open ground and high pineland, Florida, southern Alabama and Mississippi; Cuba, Jamaica.

5. *Cenchrus incertus* M. A. Curtis. COAST SANDBUR. (Fig. 1119.) Perennial, glabrous as a whole; culms 25 to

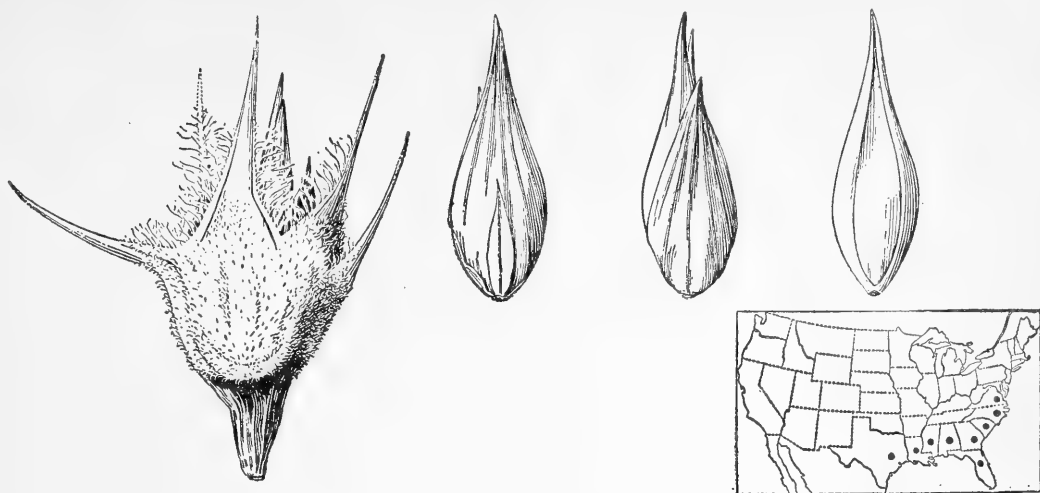


FIGURE 1119.—*Cenchrus incertus*. Bur, two views of spikelet, and floret, $\times 5$. (Curtiss, N. C.)

100 cm. tall; blades commonly folded but sometimes flat, 2 to 5 mm. wide; raceme 4 to 10 cm. long, the burs not crowded; burs about 3.5 (3 to 5) mm. wide, the body finely and densely pubescent, the base glabrous; spines few, mostly less than 5 mm. long, the lower often reduced or obsolete; spike-

spreading, 20 to 90 cm. long, rather stout; blades usually flat, 2 to 7 mm. wide; raceme usually 3 to 8 cm. long, the burs somewhat crowded; burs (excluding spines) mostly 4 to 6 mm. wide, pubescent, often densely so; spines numerous, spreading or reflexed, flat, broadened at base, the

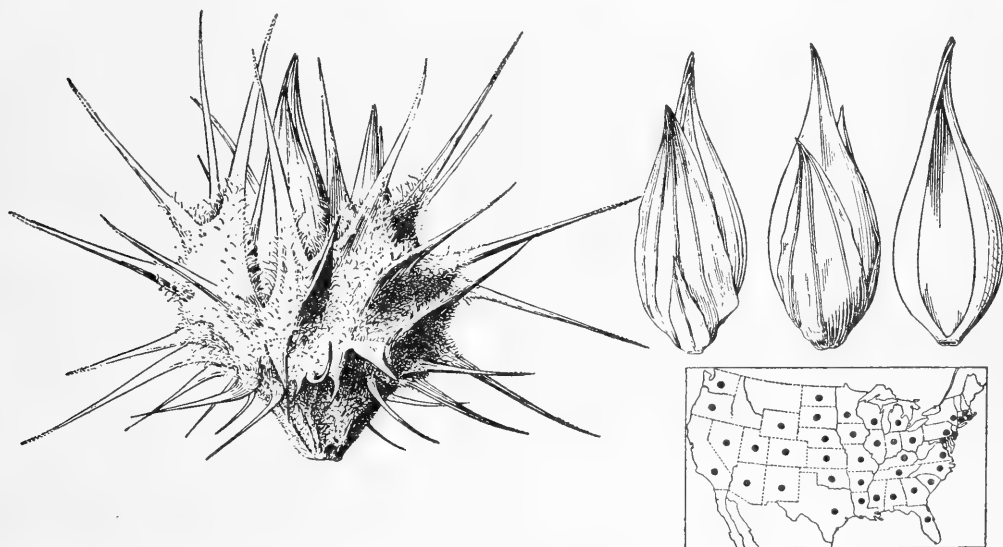


FIGURE 1120.—*Cenchrus pauciflorus*. Bur, two views of spikelet, and floret, $\times 5$. (Hitchcock 13582, N. Mex.)

lets 1 to 3 in each bur. 21 —Open sandy soil, Coastal Plain, Virginia to Florida and Texas.

6. *Cenchrus pauciflorus* Benth.
FIELD SANDBUR. (Fig. 1120.) Annual, at times a short-lived perennial, sometimes forming large mats; culms

lowermost shorter and relatively slender, some of the upper ones commonly 4 to 5 mm. long, usually villous at the base; spikelets usually 2 in each bur. ☉ (Confused with *C. tribuloides* in early manuals; *C. carolinianus* of recent manuals, not of Walt.)



FIGURE 1121.—*Cenchrus tribuloides*. Plant, $\times \frac{1}{2}$; two views of spikelet, and floret, $\times 10$. (Kearney, Va.)

—Sandy open ground, often a weed in sandy fields, Ontario to Oregon, south to Florida, Texas, and California; Mexican plateau; coastal region of tropical America; southern South America. The type, from Baja California, is a small arid-ground specimen, the burs smaller than those of plants of more favorable situations. Specimens with long spines have been differentiated as *C. albertsonii* Runyon and *C. longispinus* (Hack.) Fer-

nald. The spikelets are identical except in size.

7. *Cenchrus tribuloídes* L. DUNE SANDBUR. (Fig. 1121.) Stouter than *C. pauciflorus*; soon branching and radiate-decumbent, rooting at the nodes; sheaths usually much overlapping; burs (excluding spines) 5 to 6 mm. wide and 8 to 9 mm. high, usually conspicuously villous. ☉ —In loose sands of the coast, Staten Island, N. Y., to Florida and Louisiana; West Indies.

146. AMPHICÁRPUM Kunth

(*Amphicarpon* Raf.)

Spikelets of 2 kinds on the same plant, one in a terminal panicle, perfect but not fruitful, the other cleistogamous on slender leafless subterranean branches from the base of the culm or sometimes also from the lower nodes; first glume of the aerial spikelets variable in size, sometimes obsolete; second glume and sterile lemma about equal; lemma and palea indurate, the margins of the lemma thin and flat; fruiting spikelets much larger, the first glume wanting; second glume and sterile lemma strongly nerved, subrigid, exceeded at maturity by the turgid, elliptic, acuminate fruit with strongly indurate lemma and palea, the margins of the lemma thin and flat; stamens with small anthers on short filaments. Annual or perennial erect grasses, with flat blades and narrow terminal panicles. Type species, *Milium amphicarpon* Pursh (*Amphicarpon purshii*). Name from Greek *amphikarpos*, doubly fruit-bearing, alluding to the two kinds of spikelets.

Blades conspicuously hirsute..... 1. A. PURSHII.
Blades glabrous or nearly so..... 2. A. MUHLENBERGIANUM.

1. *Amphicarpon purshii* Kunth. (Fig. 1122.) Annual; culms erect, 30 to 80 cm. tall, the leaves crowded toward the base, hirsute; blades erect, 10 to 15 cm. long, 5 to 15 mm. wide, sharp-pointed; panicle 3 to 20 cm. long; spikelets elliptic, 4 to 5 mm. long; subterranean spikelets 7 to 8 mm. long, plump, acuminate. ☉ (*Amphicarpon amphicarpon* Nash.)—Sandy pinelands, New Jersey to Georgia.

2. *Amphicarpon muhlenbergiánum* (Schult.) Hitchc. (Fig. 1123.) Perennial; culms usually decumbent at base, 30 to 100 cm. tall; leaves evenly distributed; blades firm, white-margined when dry, mostly less than 10 cm. long, 5 to 10 mm. wide; panicle long-exserted, few-flowered; spikelets narrowly lanceolate, 6 to 7

mm. long; subterranean spikelets 6 to 9 mm. long. ☉ (*A. floridanum* Chapm.)—Low pinelands, South Carolina and Florida.

147. OLÝRA L.

Plants monoecious; inflorescence paniculate; pistillate spikelets borne on the ends of the branches of loose panicles, the smaller staminate spikelets pedicellate below the pistillate ones, sometimes the upper branches all pistillate and the lower ones all staminate; pistillate spikelets rather large; first glume wanting; second glume and sterile lemma herbaceous, often caudate-acuminate; fruit bony-indurate; staminate spikelets readily deciduous; glumes and sterile lemma wanting, the lemma and palea mem-

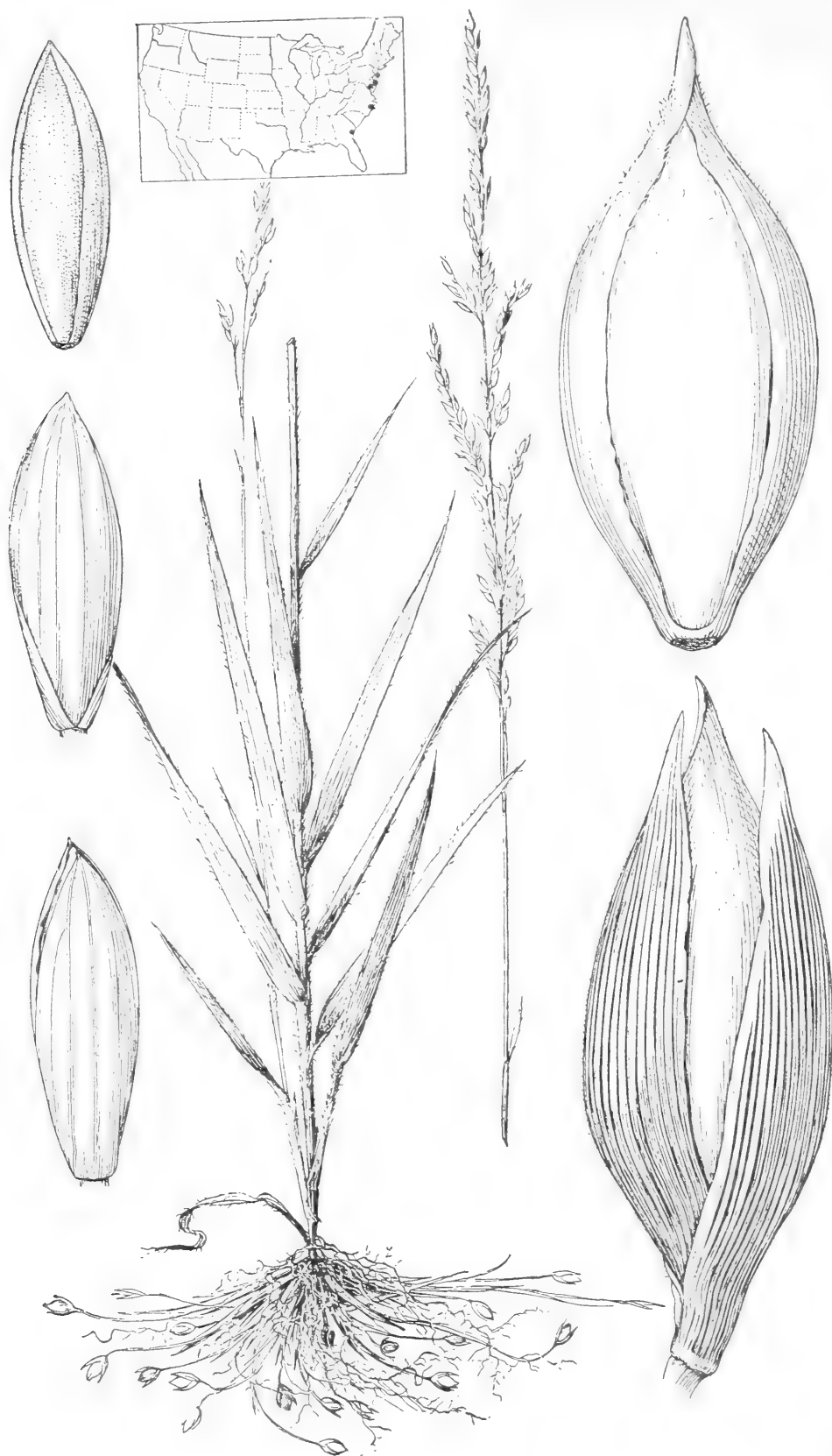


FIGURE 1122.—*Amphicarpum purshii*. Plant, $\times \frac{1}{2}$; two views of aerial spikelet and floret, and subterranean spikelet and floret, $\times 10$. (Brinton, N. J.)

branaceous. Mostly tall perennials with broad flat blades, contracted into a petiole, and open or contracted panicles of glabrous spikelets. Type species, *Olyra latifolia*. Name from *olura*, an old Greek name for a kind of grain.

1. *Olyra latifolia* L. (Fig. 1124.) Glabrous perennial, bamboolike in aspect, commonly 3 m. tall, with flat, firm, asymmetrically lanceolate-oblong, abruptly acuminate blades commonly 20 cm. long and 5 cm. wide, and ovoid panicles 10 to 15 cm. long, the branches stiffly ascending or spreading, each bearing a single large long-acuminate pistillate spikelet at the thickened summit and several small slender-pedicelled staminate spikelets along the branches. 2 — Said to occur in the region of Tampa Bay, Fla., but the record is doubtful; tropical America; Africa.



FIGURE 1123.—*Amphicarpum muhlenbergianum*, $\times 1$. (Chapman, Fla.)

TRIBE 13. ANDROPOGONEAE

148. IMPERÁTA Cyrillo

Spikelets all alike, awnless, in pairs, unequally pedicellate on a slender continuous rachis, surrounded by long silky hairs; glumes about equal, membranaceous; sterile lemma, fertile lemma, and palea thin and hyaline. Perennial, slender, erect grasses, from hard scaly rhizomes, with terminal narrow silky panicles. Type species, *Imperata cylindrica*. Named for Ferrante Imperato.

Spikelets 4 mm. long, the hairs at base twice as long; panicle oblong, rather lax.

1. *I. BRASILIENSIS*.

Spikelets 3 mm. long, the hairs three times as long; panicle elongate. 2. *I. BREVIFOLIA*.

1. *Imperata brasiliensis* Trin. (Fig. 1125.) Culms 50 to 100 cm. tall, from scaly rhizomes; leaves crowded below, 3 to 8 mm. wide, the lower blades elongate, those of the culm short, the uppermost much reduced; panicle dense, pale or silvery, mostly 10 to 12 cm. long; spikelets 4 mm. long. 2 — Pinelands, prairies, and Everglades, southern Florida and Alabama; tropical America at low altitudes.

2. *Imperata brevifolia* Vasey. SAT-INTAIL. (Fig. 1126.) Resembling *I. brasiliensis*; culms 1 to 1.5 m. tall; leaves less crowded at base, all but the uppermost elongate; panicle 15 to

30 cm. long; spikelets 3 mm. long, the hairs three times as long. 2 (*I. hookeri* Rupr. ex Hack.)—Desert regions, western Texas to southern California, Utah, and Nevada; Mexico.

Imperata cylindrica (L.) Beauv. COGON GRASS. Spikelets 4 to 5 mm. long, the hairs as long as in *I. brevifolia*. 2 — Ballast, Portland, Oreg.; recently introduced in Florida and spreading in the west central part of the State. It is fairly good forage, but because of the strong creeping rhizomes it spreads into cultivated ground and is difficult to eradicate.



FIGURE 1124.—*Olyra latifolia*. Plant, $\times \frac{1}{2}$; pistillate and staminate spikelets, and fertile floret, $\times 5$. (Chase 6416, P. R.)

FIGURE 1125.—*Imperata brasiliensis*. Plant, $\times \frac{1}{2}$; spikelet, $\times 5$. (Chapman, Fla.)



149. MISCANTHUS Anderss.

Spikelets all alike, in pairs, unequally pedicellate along a slender continuous rachis; glumes equal,

membranaceous or somewhat coriaceous; sterile lemma a little shorter than the glumes, hyaline; fertile lemma hyaline, smaller than the sterile lemma, extending into a delicate

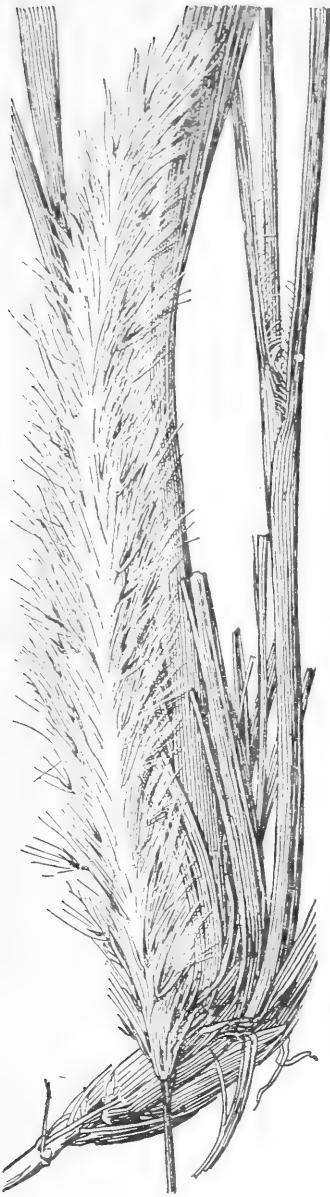


FIGURE 1126.—*Imperata brevifolia*. Plant, $\times \frac{1}{2}$.
(Toumey 782, Ariz.)

bent and flexuous awn; palea small and hyaline. Robust perennials, with long flat blades and terminal panicles of aggregate spreading slender racemes. Type species, *Miscanthus japonicus* Anderss. (*M. floridulus* (Labill.) Warb.) Name from Greek *mischos*, pedicel, and *anthos*, flower, both spikelets of the pair being pedicellate.

1. *Miscanthus sinensis* Anderss. EULALIA. (Fig. 1127.) Culms robust in large bunches, erect, 2 to 3 m. tall; leaves numerous, mostly basal, the blades flat, as much as 1 m. long,

about 1 cm. wide, tapering to a slender point, the margin sharply serrate; panicle somewhat fan-shaped, consisting of numerous silky aggregate racemes, 10 to 20 cm. long; spikelets with a tuft of silky hairs at base surrounding them and about as long as the glumes. 2 —Cultivated for ornament and now growing wild in some localities in the Eastern States; native of eastern Asia. There are three varieties in cultivation besides the usual form described above: *M. SINENSIS* var. *VARIEGATUS* Beal, with blades striped with white, *M. SINENSIS* var. *ZEBRINUS* Beal, with blades banded or zoned with white, and *M. SINENSIS* var. *GRACILLIMUS* Hitchc., with very narrow blades.

***Miscanthus nepalensis* (Trin.) Hack.** Panicles yellowish brown; spikelets about one-fourth as long as the hairs at their base. 2 —Occasionally cultivated under the name of Himalaya fairy grass. Nepal, India.

***MISCANTHUS SACCHARIFLORUS* (Maxim.) Hack.** Perennial with thick horizontal rhizomes; culms 1.5 to 2 m. tall; blades 1 to 1.8 cm. wide; panicle more silky than in *M. sinensis*, the spikelets awnless. 2 —Sparsely cultivated for ornament; escaped in Clinton County, Iowa; Asia.

150. SÁCCHARUM L.

Spikelets in pairs, one sessile, the other pedicellate, both perfect, awnless, arranged in paniced racemes, the axis disarticulating below the spikelets; glumes somewhat indurate, sterile lemma similar but hyaline; fertile lemma hyaline, sometimes wanting. Robust perennials of tropical regions. Type species, *Saccharum officinarum*. Name from Latin *saccharum* (*saccharon*), sugar, because of the sweet juice.

1. *Saccharum officinarum* L. SUGARCANE. (Fig. 1128.) Culms 3 to 5 m. tall, 2 to 3 cm. thick, solid, juicy, the lower internodes short, swollen; sheaths greatly overlapping, the lower usually falling from the culms; blades elongate, mostly 4 to 6 cm. wide, with a very thick midrib; panicle plume-



FIGURE 1127.—*Miscanthus sinensis*. Plant, much reduced; raceme, $\times \frac{1}{2}$; spikelet, $\times 5$. (Cult.)



FIGURE 1128.—*Saccharum officinarum*. Plant, much reduced; racemes, $\times \frac{1}{2}$; spikelet with pedicel and rachis joint, $\times 5$. (Pringle, Cuba.)

like, 20 to 60 cm. long, the slender racemes drooping; spikelets about 3 mm. long, obscured in a basal tuft of silky hairs 2 to 3 times as long as the spikelet. 2 —Cultivated in the Southern States, especially Louisiana, for sugar and byproducts, and for sirup, and also used for forage; commonly cultivated in tropical regions.

The sugarcanes cultivated in the United States are derived chiefly from four species and their hybrids. In the Noble canes (*S. officinarum*, chromosomes 40), described above, the axis of inflorescence is without long hairs. Chinese canes (*S. sinensis* Roxb., chromosomes about 58 to 60), with long hairs on the axis of inflor-

escence, are cultivated chiefly for sirup. *Saccharum barberi* Jeswiet (chromosomes about 45 or 46) from northern India, differs from the last in having narrower blades and more slender canes. Varieties of this species do not form an entirely homogeneous group and may later be separated into two or more species. The wild cane of Asia (*S. spontaneum* L., chromosomes 56), is used as a basis for hybrids with other species. There are numerous hybrids and varieties of the species mentioned.

SACCHARUM BENGALÉNSE Retz. MUNJ. Tall cane; blades very scabrous; panicle 70 to 80 cm. long, narrow, dense, silvery. 2 —Sometimes cultivated for ornament. India.

151. *ERIANTHUS* Michx. PLUMEGRASS

Spikelets all alike, in pairs along a slender axis, one sessile, the other pedicellate, the rachis disarticulating below the spikelets, the rachis joint and pedicel falling attached to the sessile spikelet; glumes coriaceous, equal, usually copiously clothed, at least at the base, with long silky spreading hairs; sterile lemma hyaline; fertile lemma hyaline, the midnerve extending into a slender awn; palea small, hyaline. Perennial reedlike grasses, with elongate flat blades and terminal oblong, usually dense silky panicles. Type species, *Erianthus saccharoides* (*E. giganteus*). Name from Greek *erion*, wool, and *anthos*, flower, alluding to the woolly glumes.

Spikelets naked, or nearly so, at base..... 1. *E. STRICTUS*.
Spikelets with a conspicuous tuft of hairs at base.

Awn flat, spirally coiled at base, the upper portion more or less bent and flexuous or loosely spiral.

Basal hairs nearly as long as the brownish spikelets; panicle not conspicuously hairy, the main axis and branches visible; culms usually glabrous below panicle.

2. *E. CONTORTUS*.

Basal hairs copious, about twice as long as the yellowish spikelets; panicle conspicuously woolly, the hairs hiding the main axis and branches; culms villous below panicle..... 3. *E. ALOPECUROIDES*.

Awn terete, or flattened at base, not coiled, the upper portion straight or slightly flexuous.

Basal hairs copious, much longer than the spikelet; panicle conspicuously woolly.

6. *E. GIGANTEUS*.

Basal hairs rather sparse, shorter than the spikelet; panicle not woolly.

Uppermost blade not reduced, reaching the summit of the panicle; rachis joint and pedicel terete, sparsely long-pilose..... 4. *E. BREVIBARBUS*.

Uppermost blade usually much reduced; rachis joint and pedicel somewhat angled, sparsely short-pilose..... 5. *E. COARCTATUS*.

1. *Erianthus strictus* Baldw. NARROW PLUMEGRASS. (Fig. 1129.) Culms 1 to 2 m. tall, relatively slender, glabrous; nodes hirsute with stiff erect deciduous hairs; foliage glabrous, the lower sheaths narrow, crowded, the blades mostly 8 to 12 mm. wide; panicle 20 to 40 cm. long,

strict, the branches closely appressed; spikelets brown, about 8 mm. long, scabrous, nearly naked to sparsely short-hairy at base; awn straight, about 15 mm. long; rachis joint and pedicel scabrous. 2 —Marshes and wet places, Coastal Plain, Vir-



FIGURE 1129.—*Erianthus strictus*, $\times \frac{1}{2}$. (Curtiss 6936, Fla.)

ginia to Florida and Texas, north to Tennessee and southern Missouri.

2. *Erianthus contortus* Baldw. ex Ell. BENT-AWN PLUMEGRASS. (Fig. 1130.) Culms 1 to 2 m. tall, glabrous or sometimes sparsely appressed-pilose below the panicle; nodes glabrous or pubescent with erect deciduous hairs; sheaths sparsely pilose at summit or glabrous; blades 1 to 1.5 cm. wide, scabrous; panicle 15 to 30 cm. long, narrow, the branches ascending but not closely appressed; spikelets 6 to 8 mm. long, brownish, basal hairs nearly or about as long as the spikelet, awn about 2 cm. long, spirally coiled at base; rachis joints and pedicels villous. \mathfrak{Q} —Moist sandy pinelands or open ground, Coastal Plain, Maryland to Florida

and Texas, north to Tennessee and Oklahoma.

3. *Erianthus alopecuroides* (L.) Ell. SILVER PLUMEGRASS. (Fig. 1131.) Culms robust, 1.5 to 3 m. tall, appressed-villous below the panicle, and usually on the nodes; sheaths pilose at the summit; blades 1.2 to 2 cm. wide, scabrous, pilose on upper surface toward the base; panicle 20 to 30 cm. long, silvery to tawny or purplish; spikelets 5 to 6 mm. long, pale, sparsely villous, shorter than the copious basal hairs; awn 1 to 1.5 cm. long, flat, loosely twisted; rachis joint and pedicel long-villous, \mathfrak{Q} (*E. divaricatus* Hitchc.)—Damp woods, open ground, and borders of fields,



FIGURE 1130.—*Erianthus contortus*, $\times \frac{1}{2}$. (Amer. Gr. Natl. Herb. 234, S. C.)



FIGURE 1131.—*Erianthus alopecuroides*, $\times \frac{1}{2}$. (Chase 4213, Fla.)

southern New Jersey to southern Illinois, southern Missouri, and Oklahoma, south to Florida and Texas. *ERIANTHUS ALOPECUROIDES* var. *HIRSUTUS* Nash. Sheaths and lower surface of the blades appressed-hirsute. 2 — North Carolina and Florida.

4. *Erianthus brevibarbis* Michx. (Fig. 1132.) Culms stout, nearly 2 m. tall, with 9 or 10 nodes; glabrous; sheaths glabrous or sparingly pubescent at the summit; blades scabrous on the upper surface, pilose at the base, 1 to 1.5 cm. wide, the upper not reduced; panicle 35 cm. long, tawny brown, not conspicuously woolly; spikelets 6 to 7 mm. long; glumes

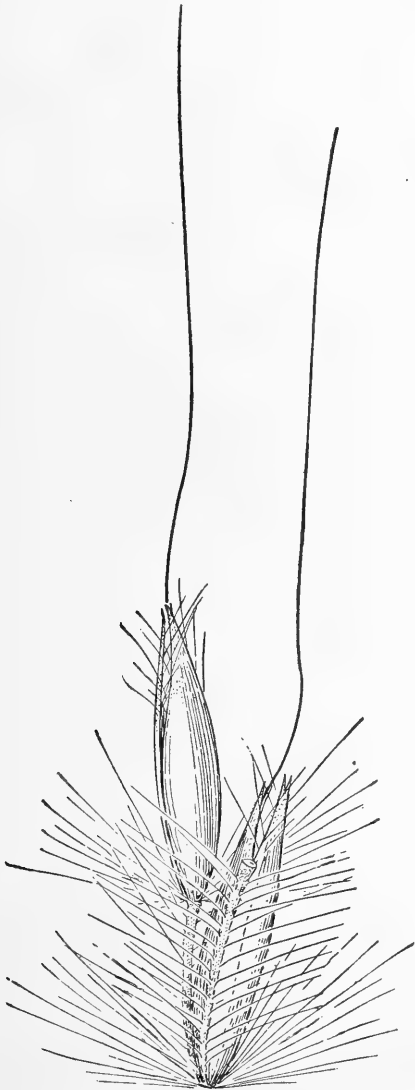


FIGURE 1132.—*Erianthus brevibarbis*. Pair of spikelets with pedicel and rachis joint, $\times 5$. (Demaree 8228, Ark.)



FIGURE 1133.—*Erianthus coarctatus*. Pair of spikelets with pedicel and rachis joint, $\times 5$. (Type collection.)

acuminate, glabrous or with a few long hairs on the inflexed margins, the spreading basal hairs about two-thirds as long as the spikelet; awn terete, straight or subflexuous, 1.5 to 1.6 cm. long; rachis joint and pedicel sparsely long-pilose. 2 — Dry hills, southern Illinois (type) and Arkansas (Pulaski County); rare.

5. *Erianthus coarctatus* Fernald. (Fig. 1133.) Culms relatively slender, 75 to 150 cm. tall, subcompressed, the nodes bearded, appressed-pubes-

cent, or glabrescent; sheaths glabrous, the lower narrow, somewhat keeled; blades 3 to 10 mm. wide, scaberulous, the upper reduced; panicle 10 to 27 cm. long, 2.5 to 4 cm. wide, purplish brown, not conspicuously woolly; spikelets 7 to 8 mm. long; glumes acuminate, scaberulous, the first sometimes with a few long hairs on the back, the second without hairs on the inflexed margins, the basal hairs about half as long as the spikelet; awn terete, straight, 1.5 to 2.3 cm. long, straight; rachis joint and pedicel somewhat angled, very sparsely short-pilose. ♀ —Peaty, sandy, moist meadows and swales and margin of swamps, Delaware, Maryland, Virginia, Georgia, and Florida (near Gainesville); insufficiently known, apparently rare.



FIGURE 1134.—*Erianthus coarctatus* var. *elliotianus*. Racemes, $\times \frac{1}{2}$. (Hitchcock, N. C.)

ERIANTHUS COARCTATUS var. **ELLIOTIANUS** Fernald. (Fig. 1134.) Taller and more robust, resembling *E. brevibarbis*, but nodes appressed-pubescent, upper blades mostly reduced, the brownish panicle mostly smaller; spikelets 7 mm. long, more slender, as in *E. coarctatus*, the first glume usually with a few long hairs on the back, occasionally the second glume likewise, the margins without long hairs; awns, rachis joints, and pedicels as in *E. coarctatus*. ♀ —Wet ground, swales, and pond borders, North Carolina to Florida; Louisiana.

This group is insufficiently known;

the size of upper blade and pubescence on spikelets is not constant.

6. Erianthus gigantéus (Walt.) Muhl. SUGARCANE PLUMEGRASS. (Fig. 1135.) Culms 1 to 3 m. tall, appressed-villous below the panicle, the nodes appressed-hispid, the hairs deciduous; sheaths and blades from nearly glabrous to shaggy appressed-villous, the blades 8 to 15 mm. wide; panicle 10 to 40 cm. long, oblong or ovoid, tawny to purplish; spikelets 5 to 7 mm. long, sparsely long-villous on the upper part, shorter than the copious basal hairs; awn 2 to 2.5 cm. long, terete, straight or slightly flexuous; rachis joint and pedicel long-pilose. ♀ (*E. saccharoides* Michx.)—Moist soil, Coastal Plain, New York to Florida and Texas, north to Kentucky; Cuba. A common form with relatively small compact panicles has been segregated as *E. compactus* Nash; a robust form with long, copiously silky, tawny panicle, as *E. tracyi* Nash; and a form with rather looser panicle, the lower rachis joints longer than the spikelets, and pubescent foliage was described from Florida as *E. laxus* Nash.

Erianthus ravénnae (L.) Beauv. RAVENNA GRASS. (Fig. 1136.) Culms stout, as much as 4 m. tall; panicle as much as 60 cm. long, silvery (purplish in var. *purpurascens* (Anderss.) Hack.); spikelets awnless or nearly so. ♀ —Cultivated for ornament; hardy as far north as New York City; native of Europe. Established along irrigation ditches near Phoenix, Ariz.

152. MICROSTÉGIUM Nees

(Included in *Eulalia* Kunth in Manual, ed. 1)

Spikelets in pairs, alike, perfect, on an articulate rachis, 1 sessile, 1 pedicellate; racemes 1 to several, digitate or approximate; first glume sulcate. Straggling annuals with flat lanceolate blades. Type species, *M. willdenovianum* Nees (*M. vimineum* (Trin.) A. Camus). Name from Greek *micros*, small, and *stēge*, cover, probably alluding to the minute lemma.



FIGURE 1135.—*Erianthus giganteus*. Plant, $\times \frac{1}{2}$; spikelet with pedicel and rachis joint, $\times 5$. (Langlois 96, La.)



FIGURE 1126.—*Erianthus ravennae*. Racemes, $\times 1$. (Cult.)



FIGURE 1137.—*Microstegium vimineum*, $\times 1$. (Wilkins 3716, Tenn.)



FIGURE 1138.—*Arthraxon hispidus* var. *cryptatherus*, $\times 1$. (Cult.)

1. *Microstegium vimineum* (Trin.) A. Camus. (Fig. 1137.) Annual; culms slender, straggling, rooting at the nodes, 50 to 100 cm. long, freely branching; blades lanceolate, 3 to 8 cm. long, 5 to 10 mm. wide; racemes

2 to 6, sometimes only 1, approximate; spikelets about 5 mm. long. ☉ (*Eulalia viminea* (Trin.) Kuntze.) —Shaded banks and roadsides, Ohio, Virginia, North Carolina, Kentucky, Tennessee, and Alabama. Introduced from Asia.

MICROSTEGIUM VIMINEUM var. **IMBÉRBE** (Nees) Honda, an awned form, found in Berks County, Pa., and Greenville, Va.

153. *ARTHRAXON* Beauv.

Perfect spikelets usually awned, sessile, the secondary spikelet and its pedicel wanting or the pedicel (rarely a spikelet) developed only at the lower joints of the filiform articulate rachis; racemes terminating the branches of a dichotomously forking panicle, in appearance subdigitate or fascicled. Usually low creeping grasses with broad cordate-clasping blades and subflabellate panicles. Type species, *Arthraxon ciliaris* Beauv. Name from Greek *arthron*, joint, and *axon*, axis, alluding to the jointed rachis.

1. *Arthraxon hispidus* (Thunb.) Makino. Annual; culms slender, branching, decumbent or creeping, 20 to 100 cm. long; sheaths hispid; blades ovate to ovate-lanceolate, 2 to 5 cm. long, 5 to 15 mm. wide, ciliate toward base; panicles of few to several racemes, flabellate, contracting toward maturity, on filiform peduncles; rachis joints glabrous; spikelets 4 to 5 mm. long, the strong nerves aculeate-scabrous; sterile lemma with a slender geniculate awn. ☉ —Waste ground, rare, Maryland (near Washington, D. C.), Missouri (St. Louis), and Louisiana (Richland County). **A. HISPIDUS** var. **CRYPTÁTHERUS** (Hack.) Honda. (Fig. 1138.) Spikelets slightly smaller; awn wanting or included in the glumes. ☉ —Pastures, lawns, and open ground in a few localities, Pennsylvania to Florida and Tennessee; Arkansas and Washington; introduced from the Orient.

154. ANDROPÓGON L. BEARDGRASS

Spikelets in pairs at each node of an articulate rachis, one sessile and perfect, the other pedicellate and either staminate, neuter, or reduced to the pedicel, the rachis and pedicels of the sterile spikelets often villous, sometimes conspicuously so; glumes of fertile spikelet coriaceous, narrow, the first rounded, flat, or concave on the back, the median nerve weak or wanting, the second laterally compressed; sterile lemma shorter than the glumes, empty, hyaline; fertile lemma hyaline, narrow, entire or bifid, usually bearing a bent and twisted awn from the apex or from between the lobes; palea hyaline, small or wanting; pedicellate spikelet awnless, sometimes staminate and about as large as the sessile spikelet, sometimes consisting of 1 or 2 reduced glumes, sometimes wanting, only the pedicel present. Rather coarse grasses (perennial in the United States), with solid culms, the spikelets arranged in racemes, these numerous, aggregate on an exserted peduncle, or single, in pairs, or sometimes in threes or fours, the common peduncle usually enclosed by a spathe-like sheath, these sheaths often numerous, the whole forming a compound inflorescence, usually narrow, but sometimes in dense subcorymbose masses. Standard species, *Andropogon distachyus* L. Name from Greek *aner* (*andr-*), man, and *pogon*, beard, alluding to the villous pedicels of the staminate or sterile spikelets.

Several of the species, especially in the Southwest, are regarded as good forage grasses but may soon become woody toward maturity and thus decrease in value. *Andropogon gerardi*, big bluestem, is the most important constituent of the wild hay of the prairie States. The amount is decreasing rapidly because the rich land upon which it grows is being converted into cultivated fields. Little bluestem (*A. scoparius*) is also a common constituent of wild hay.

Racemes solitary on each peduncle; rachis joints oblique and hollow at the summit.

SECTION 1. SCHIZACHYRIUM.

Racemes 2 to numerous on each peduncle.

Racemes 2 to several on each peduncle, digitate; joints of rachis slender, sometimes with a shallow groove on one side..... SECTION 2. ARTHROLOPHIS.

Racemes several to numerous (rarely few) in a leafless panicle usually on a relatively long axis, the joints of the rachis flat, the margins thick and ciliate, the center very thin.

SECTION 3. AMPHILOPHIS.

Section 1. *Schizachyrium*

Blades slender, terete, the upper surface a mere groove..... 1. *A. GRACILIS*.

Blades flat or folded, not terete.

First glume of sessile spikelet pubescent..... 3. *A. HIRTIFLORUS*.

First glume of sessile spikelet glabrous.

Internodes of rachis relatively thick, glabrous or ciliate at base and near apex only; racemes straight.

Sessile spikelet 4 mm. long; blades about 1 mm. wide..... 2. *A. TENER*.

Sessile spikelet 6 to 9 mm. long; blades mostly 2 to 3 mm. wide.

Sterile pedicel ciliate from below the middle to the apex; sterile spikelet about 3 mm. long, the awn somewhat exserted..... 4. *A. SEMIBERBIS*.

Sterile pedicel ciliate only at the apex; sterile spikelet about 5 mm. long, the awn wanting or included..... 5. *A. CIRRATUS*.

Internodes of rachis and sterile pedicels slender, villous throughout or nearly so; racemes flexuous.

Culms tufted; rhizomes wanting (base sometimes slightly rhizomatous in *A. littoralis*).

Sheaths and blades glabrous or nearly so (occasionally sparsely to conspicuously pilose in *A. scoparius*); pedicellate spikelet usually much reduced.

Racemes nearly straight, densely villous, the hairs obscuring the rachis and spikelets; blades 5 to 9 cm. long, spreading..... 6. *A. NIVEUS*.

- Racemes flexuous, the hairs not obscuring the rachis and spikelets; blades more than 10 cm. long, usually elongate.
- Racemes numerous in a dense flabellate but delicate inflorescence; sessile spikelet 5 mm. long..... 7. *A. SERICATUS*.
- Racemes relatively few in a narrow elongate inflorescence; sessile spikelet 6 to 10 mm. long.
- Culms strictly erect; sessile spikelet 6 to 8 mm. long; hairs on the rachis and sterile pedicel inconspicuous..... 8. *A. SCOPARIUS*.
- Culms decumbent at the base, usually very glaucous; sessile spikelet about 1 cm. long; hairs on the rachis and sterile pedicel rather prominent.
9. *A. LITORALIS*.
- Sheaths and blades villous; pedicellate spikelet prominent.... 10. *A. DIVERGENS*.
- Culms solitary or few together; creeping rhizomes developed.
- Sessile spikelet 8 to 10 mm. long; sterile spikelet mostly not much reduced.
11. *A. MARITIMUS*.
- Sessile spikelet 5 to 7 mm. long; sterile spikelet much reduced.
- Rachis tortuous, the joints as long as the sessile spikelets; blades 1 to 3 mm. wide, at least some of them involute..... 12. *A. RHIZOMATUS*.
- Rachis somewhat flexuous, but not conspicuously tortuous; blades mostly 3 to 5 mm. wide, flat..... 13. *A. STOLONIFER*.

Section 2. *Arthrolophus*

- 1a. Pedicellate spikelet staminate, similar to the sessile spikelet, but awnless.
- Rhizomes short or wanting; rachis joint and sterile pedicel ciliate, the joints short-hispid at base; awn of sessile spikelet 1 to 2 cm. long..... 14. *A. GERARDI*.
- Rhizomes well developed; rachis joint and sterile pedicel densely long-villous; awn of sessile spikelet rarely more than 5 mm. long, often obsolete..... 15. *A. HALLII*.
- 1b. Pedicellate spikelet reduced to 1 or 2 glumes, or obsolete, the pedicel only developed; racemes silky-villous.
- 2a. Inflorescence very decompound, the profuse pairs of racemes aggregate in an elongate or corymbose mass; spathes rarely more than 2 mm. wide; pedicellate spikelet obsolete (see also *A. virginicus* var. *hirsutior*)..... 27. *A. GLOMERATUS*.
- 2b. Inflorescence not conspicuously decompound nor dense (rather dense in *A. virginicus* var. *hirsutior*).
- 3a. Peduncle not more than 1 cm. long, the dilated spathes exceeding the 2 (occasionally 3 or 4) racemes.
- Upper sheaths inflated spathe-like, aggregate, the late inflorescence a flabellate tuft.
28. *A. ELLIOTTII*.
- Upper sheaths not inflated and aggregate.
- Blades of the innovations subfiliform; ligule acute, protruding from the folded blade; foliage usually glabrous..... 23. *A. PERANGUSTATUS*.
- Blades 2 to 5 mm. wide; ligule minute, concealed within the folded blade; foliage from obscurely to conspicuously pubescent.
- Hairs of the racemes copious..... 22. *A. LONGIBERBIS*.
- Hairs of the racemes comparatively sparse.
- Rachis joints shorter than the spikelets; branches glabrous below the spathes.
25. *A. CAPILLIPES*.
- Rachis joints usually as long as the spikelets; branches, at least some of them, bearded below the spathes..... 26. *A. VIRGINICUS*.
- 3b. Peduncles 2 cm. long or more.
- 4a. Peduncles not more than 5 cm. long, enclosed in the spathe or only slightly exerted (see also *A. perangustatus*).
- Racemes usually not more than 15 mm. long; ultimate branchlets capillary, spreading or recurved, long-villous at summit..... 24. *A. BRACHYSTACHYS*.
- Racemes 2 to 5 cm. long.
- Racemes 4 to 6 to a peduncle, tawny; sheaths villous..... 16. *A. MOHRII*.
- Racemes 2 to a peduncle, silvery or creamy white; sheaths glabrous or nearly so.
- Pairs of racemes numerous; spathes inconspicuous, at least some of the peduncles as much as 5 cm. long..... 20. *A. FLORIDANUS*.
- Pairs of racemes not more than 10 to a culm; spathes dilated; peduncles 1 to 3 cm. long..... 21. *A. TRACYI*.
- 4b. Peduncles or most of them 5 to 15 cm. long, long-exserted (short-exserted peduncles intermixed with long in *A. elliotii* and *A. subtenuis*).
- Rachis joints longer than the spikelets; racemes 5 to 10 cm. long, conspicuously slender and flexuous..... 30. *A. CAMPYLORACHEUS*.
- Rachis joints not longer than the spikelets; racemes not more than 7 cm. long, usually not more than 5 cm.

- Upper sheaths inflated, overlapping, conspicuous..... 29. *A. ELLIOTII*.
 Upper sheaths not inflated, overlapping, nor conspicuous.
 Spikelets 4 mm. long; racemes very flexuous, the rachis joints nearly as long as the spikelets..... 29. *A. SUBTENUIS*.
 Spikelets 5 to 7 mm. long; racemes slightly or not at all flexuous, the rachis joints distinctly shorter than the spikelets.
 Sessile spikelets about 5 mm. long, about 0.5 mm. wide, the glume deeply grooved; hairs of racemes not obscuring the spikelets.
 19. *A. ARCTATUS*.
 Sessile spikelets somewhat more than 5 mm. long, 1 to 1.5 mm. wide, the glume concave but not grooved; hairs of racemes conspicuous to copious.
 Racemes copiously long-villous, the hairs about twice as long as the spikelet and obscuring it; first glume of sessile spikelet nerveless and glabrous between the keels..... 18. *A. TERNARIUS*.
 Racemes not copiously villous, the hairs about as long as the spikelet, not obscuring it; first glume of sessile spikelet scabrous and often 2-nerved between the keels..... 17. *A. CABANISHII*.

Section 3. *Amphilophis*

- Racemes 3 to 7, not conspicuously woolly; pedicellate spikelet about as large as the sessile one. Sessile spikelet often pitted..... 31. *A. WRIGHTII*.
 Racemes few to many, conspicuously woolly; pedicellate spikelet reduced.
 Panicle subflabellate, often short-exserted or included at base in a dilated sheath; racemes few to many on a relatively short axis; spikelets 5 to 6 mm. long.
 33. *A. BARBINODIS*.
 Panicle oblong, usually long-exserted; racemes numerous on a long axis; spikelets 3.5 to 6 mm. long.
 First glume of sessile spikelet pitted..... 32. *A. PERFORATUS*.
 First glume of sessile spikelet not pitted.
 Spikelets awned..... 34. *A. SACCHAROIDES*.
 Spikelets awnless..... 35. *A. EXARISTATUS*.

SECTION 1. *SCHIZACHYRIUM* (Nees) Trin.

Branching perennials; racemes solitary on each peduncle; rachis joints tapering to base, the apex oblique and hollow; sessile spikelets awned, the awns twisted, geniculate.

1. *Andropogon gracilis* Spreng. (Fig. 1139.) Culms slender, wiry, densely tufted, erect, glabrous, 20 to 60 cm. tall; blades terete, filiform; peduncles few to several, filiform, long-exserted, with a tuft of long white hairs at summit; raceme 2 to 4 cm. long, silvery white; rachis slender, flexuous, copiously long-villous; sessile spikelet about 5 mm. long, the awn 1 to 2 cm. long; pedicellate spikelet reduced to an awned or awnless glume, the pedicel very villous. 21 —Rocky pine woods southern Florida; West Indies.

2. *Andropogon téner* (Nees) Kunth. (Fig. 1140.) Culms slender, tufted, sometimes reclining or decumbent, 60 to 100 cm. long, the upper half



FIGURE 1139.—*Andropogon gracilis*, $\times 1$. (Hitchcock 682, Fla.)

rather sparingly branching; blades scarcely 1 mm. wide, flat or loosely involute, often sparingly long-pilose on upper surface near base; raceme finally long-exserted, slender, subterete, glabrous, 2 to 6 cm. long;



FIGURE 1140.—*Andropogon tener*, $\times 1$. (Rolf 986, Fla.)

sessile spikelet about 4 mm. long, the awn 7 to 10 mm. long; 2 — Dry pine woods and prairies, Coastal Plain, Georgia to Florida, Texas, and Oklahoma; tropical America.

3. *Andropogon hirtiflorus* (Nees) Kunth. (Fig. 1141.) Culms tufted, 60 to 120 cm. tall, erect, reddish, the upper half sparingly branching; foliage often glaucous, the blades 2 to 4 mm. wide; raceme 6 to 10 cm. long, the



FIGURE 1141.—*Andropogon hirtiflorus*, $\times 1$. (Chase 4193, Fla.)

base often included in the somewhat dilated sheath, the rachis joints, pedicels, and first glume of sessile spikelet pubescent, the rachis straight; sessile spikelet about 6 mm. long, the awn 10 to 15 mm. long; pedicellate spikelets much reduced, short-awned. 2 (*A. oligostachyum* Chapm.)—Pine woods, southern Georgia and Florida; tropical America. **ANDROPOGON HIRTIFLORUS** var. **FLÉNSIS** (Fourn.) Hack. Blades scabrous; sessile spikelet as much as 9 mm. long, the first glume minutely papillose, the pubescence less copious. 2 —Canyons and rocky slopes, western Texas to Arizona; Mexico.



FIGURE 1142.—*Andropogon semiberbis*, $\times 1$. (C. H. Baker 327, Fla.)

FIGURE 1143.—*Andropogon cirratus*, $\times 1$. (Greene 406, N. Mex.)

4. *Andropogon semiberbis* (Nees) Kunth. (Fig. 1142.) Culms usually in rather small tufts, 60 to 120 cm. tall, erect, pinkish, compressed, the upper third to half freely branching; blades 2 to 4 mm. wide, glabrous; raceme 5 to 8 cm. long, the base often included in the sheath, the rachis straight, the joints short-

hispid at base with erect hairs; sessile spikelet about 6 mm. long, the awn 10 to 15 mm. long; pedicellate spikelet much reduced, short-awned, the pedicel more or less ciliate on one margin. 2 — Pine woods, Florida; tropical America.

5. *Andropogon cirrátus* Hack.
TEXAS BEARDGRASS. (Fig. 1143.) Plants pale, glaucous to purplish; culms slender, tufted, 30 to 70 cm. tall, erect, the upper half sparingly branching; blades flat, 1 to 4 mm. wide, usually scabrous; raceme exserted, 3 to 6 cm. long, the rachis straight; sessile spikelet 8 to 9 mm. long, the awn 5 to 10 mm. long; pedicellate spikelet scarcely reduced, awnless, the pedicel stiffly ciliate on one side near the summit. 2 — Canyons and rocky slopes, western Texas to Arizona and southern California (Jamacha); northern Mexico.

6. *Andropogon níveus* Swallen. (Fig. 1144.) Culms 50 to 65 cm. tall, slender, erect in small tufts; sheaths narrow, keeled, glabrous; blades 5 to 9 cm. long, 1 to 2 mm. wide, flat, spreading or reflexed; raceme 3 to 4 cm. long, the rachis nearly straight or somewhat flexuous, the joints very densely villous; sessile spikelet 5 to 6 mm. long, the first glume glabrous, obscurely bifid at the summit, 2-nerved between the keels; awn about 1 cm. long, tightly twisted below the bend; pedicellate spikelet 3 mm. long, the pedicel densely villous. 2 — Open sandy woods, central Florida.

7. *Andropogon sericátus* Swallen. (Fig. 1145.) Culms 50 to 80 cm. tall, slender, tufted, erect, profusely branching in the upper half; sheaths keeled, glabrous, mostly shorter than the internodes; blades of the innovations subfiliform, 10 to 20 cm. long, the culm blades broader, 2 to 3 mm. wide, folded; spathes very inconspicuous; peduncles filiform, 4 to 6 cm. long; raceme 3 cm. long, scarcely exserted, the rachis flexuous, conspicuously hairy; sessile spikelet 5 mm. long, the first glume prominently 2-keeled, sulcate; awn 15 to



FIGURE 1144.—*Andropogon níveus*, $\times 1$. (Type.)



FIGURE 1145.—*Andropogon sericatus*, $\times 1$. (Type.)

20 mm. long, geniculate, tightly twisted below the bend; pedicellate spikelet 3 to 4 mm. long, including the short awn. 2 — Ramrod Key, Fla.

8. *Andropogon scopáriu* Michx.
LITTLE BLUESTEM. (Fig. 1146.) Plants green or glaucous, often purplish, culms tufted, from slender to robust, compressed, 50 to 150 cm. tall, erect, the upper half freely branching; sheaths and blades commonly glabrous or nearly so, frequently sparsely pilose at their junction, rarely pubescent to villous throughout, the

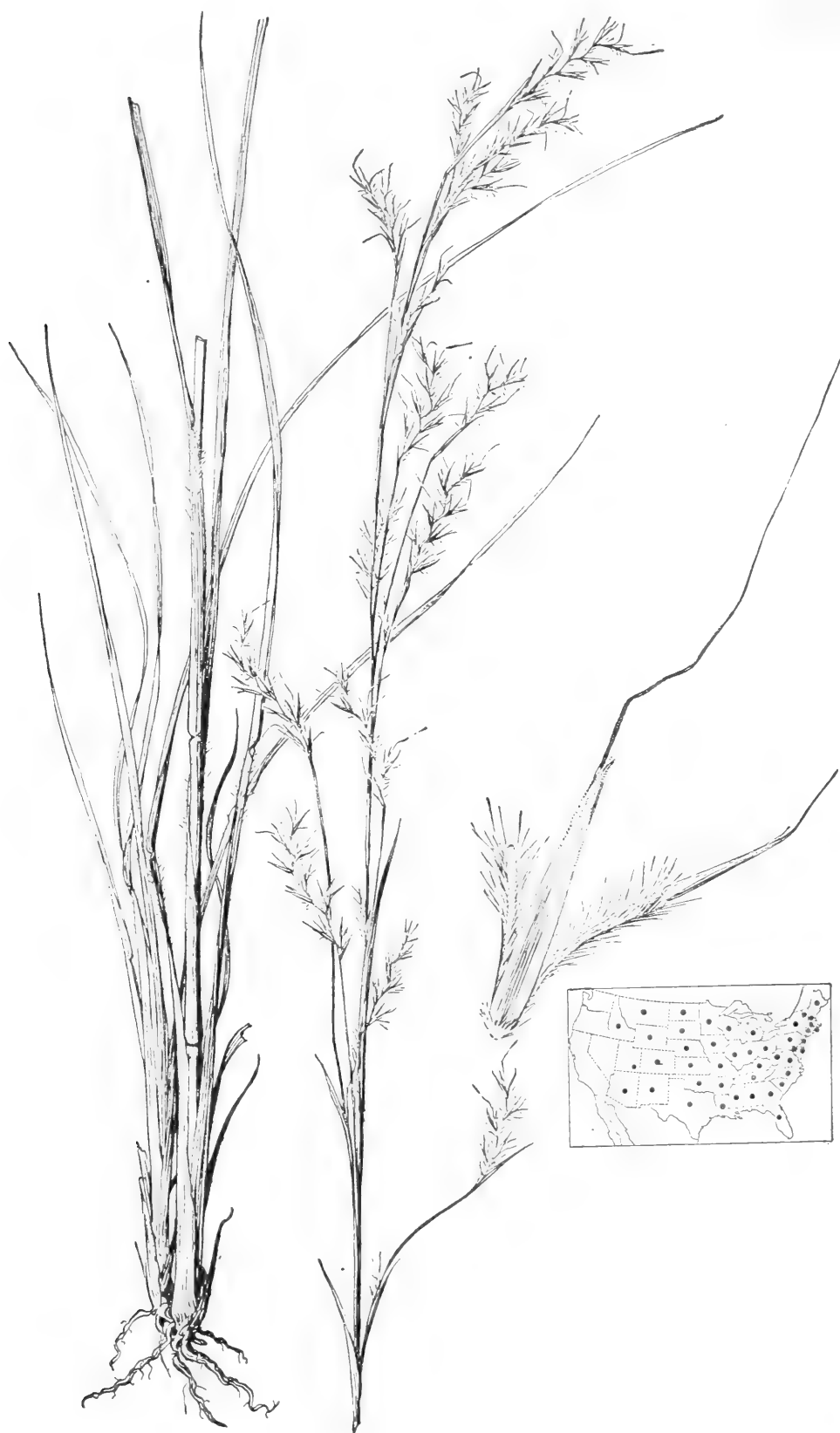


FIGURE 1146.—*Andropogon scoparius*. Plant, $\times \frac{1}{2}$; pair of spikelets, $\times 5$. (Amer. Gr. Natl. Herb. 268, D. C.)

blades 3 to 6 mm. wide, flat; raceme 3 to 6 cm. long, mostly curved, the filiform peduncles mostly wholly or partly included in the sheaths, commonly spreading, the rachis slender, flexuous, pilose, sometimes copiously so; sessile spikelet mostly 6 to 8 mm. long, scabrous, the awn 8 to 15 mm. long; pedicellate spikelet usually reduced, short-awned, spreading, the pedicel pilose. 2 —Prairies, open woods, dry hills, and fields, Quebec and Maine to Alberta and Idaho, south to Florida and Arizona. A form with villous foliage has been segregated as *A. scoparius* var. *villosissimus* Kearney (*Schizachyrium villosissimum* Nash). *Schizachyrium acuminatum* Nash was described from a specimen, otherwise typical, having spikelets 10 mm. long. Specimens with spikelets 4.5 to 6 mm. long and reduced sterile spikelets have been differentiated as var. *frequens* Hubb., and northern specimens with few racemes, relatively distant spikelets 7 to 8 mm. long, and sterile spikelets, including awn, 6.5 to 10 mm. long, as var. *septentrionalis* Fern. and Griseb. Specimens from Virginia to South Carolina, collected from June 8 to September 13, have been segregated as *Andropogon praematurus* Fernald.¹⁵

ANDROPOGON SCOPARIUS var. **NEOMEXICANUS** (Nash) Hitchc. (Fig. 1147.) Rachis and pedicels copiously villous, the rachis mostly nearly straight. In the Southwest the species verges into this variety. 2 (*Schizachyrium neomexicanum* Nash.)—Sandy soil and rocky hills, Texas to Arizona.

9. *Andropogon littorá* is Nash. (Fig. 1148.) Resembling *A. scoparius*, but culms more compressed, with broad, keeled, overlapping lower sheaths, often bluish-glaucous, the flat tufts crowded on a slender rhizome, decumbent or bent at base; blades 4



FIGURE 1147.—*Andropogon scoparius* var. *neomexicanus*, $\times 1$ (Wooton, N. Mex.)

to 6 mm. wide; rachis joints and pedicels copiously long-villous. 2 —Sandy shores, Ontario; Massachusetts and Staten Island, N. Y., to North Carolina; Ohio (Sandusky); Indiana (sand dunes of Lake Michigan); southeastern Texas. A short specimen without rhizomes and with a rather crowded inflorescence, from Elizabeth Islands, Mass., has been described as *A. scoparius* var. *ducis* Fern. and Griseb.

10. *Andropogon divérgens* (Hack.) Anderss. ex Hitchc. (Fig. 1149.) Culms rather robust, 80 to 120 cm. tall, sparingly branching toward the summit; sheaths grayish villous, the lower crowded, compressed-keeled; blades rather firm, 3 to 6 mm. wide, villous, elongate, flat or folded; raceme mostly 3 to 4 cm. long, mostly 6- to 8-jointed, rather stout, usually partly included, the rachis slightly to strongly flexuous, rather stout, the joints long-ciliate on the upper half, rarely throughout, and with a short tuft of hairs at the summit, the pedicel long-ciliate on the upper half; sessile spikelet 6 to 8 mm. long, minutely roughened, the awn 5 to 10 mm. long; pedicellate spikelet about as long as the sessile one, the first

¹⁵ There are numerous collections of *A. scoparius* throughout its range made in June, July, and August. *A. praematurus*, with a single pedicellate spikelet at each joint of the rachis, was differentiated from *A. scoparius*, which is said to have 2 pedicels. In *A. scoparius*, as in all species of *Andropogon*, each rachis joint bears 1 sessile and 1 pedicellate spikelet. The second "truncate" pedicel described was undoubtedly a rachis joint from which a sessile spikelet had fallen.



FIGURE 1148.—*Andropogon littoralis*, $\times 1$. (Burk, N. J.)

glume awn-tipped. 21 — Pinelands, Mississippi to Arkansas and Texas.

11. *Andropogon maritimus* Chapm. (Fig. 1150.) Culms solitary, compressed, ascending from a decumbent, short-noded base, 50 to 60 cm. long, branching toward the ends, and with long creeping rhizomes; sheaths overlapping on the short internodes, strongly keeled, commonly reddish; blades 3 to 5 mm. wide, often folded and reflexed, the midnerve deeply impressed; raceme 4 to 6 cm. long, the base included in the dilated sheath, the rachis very flexuous, the joints and pedicels copiously long-ciliate except at base; sessile spikelet

8 to 10 mm. long, the awn 8 to 12 mm. long; pedicellate spikelet scarcely reduced, short-awned. 24 —



FIGURE 1149.—*Andropogon divergens*, $\times 1$. (Tharp 3094, Tex.)



FIGURE 1150.—*Andropogon maritimus*, $\times 1$. (Chapman, Fla.)

Sandy ground along the Gulf coast, western Florida, Mississippi (Horn Island), and Louisiana (Last Island).

12. *Andropogon rhizomátus* Swallen. (Fig. 1151.) Culms 50 to 70 cm. tall, scattered or in small dense tufts, erect from short rhizomes, sparingly branching above the middle; sheaths rounded or obscurely keeled, much longer than the internodes; blades 10 to 25 cm. long, 1 to 3 mm. wide, flat or loosely involute, glabrous; raceme 2 to 3 cm. long, strongly flexuous, partly enclosed or exerted from the very inconspicuous spathe; peduncles 3 to 7 cm. long; sessile spikelet 5 to 6 mm. long, the first glume rounded on the back, obscurely keeled near the summit; awn 8 to 10 mm. long, geniculate, twisted below the bend; pedicellate spikelet 2 to 3 mm. long. ♀ — Rocky ground, southern Florida.

13. *Andropogon stolónifer* (Nash) Hitchc. (Fig. 1152.) Resembling *A. scoparius*; culms as much as 1.5 m. tall, solitary or few in a tuft, with slender, creeping scaly rhizomes; foliage glabrous to villous, the blades flat, as much as 5 mm. wide; racemes 3 to 4 cm. long, the slender rachis joints and pedicels silky villous; first glume of both sessile and pedicellate spikelets sometimes bifid at apex; sessile spikelet 5 to 7 mm. long, scabrous, especially toward the summit and on the margins. ♀ (*Schizachyrium triaristatum* Nash.)—Sandy woods, southern Georgia, Florida, and Alabama.

SECTION 2. ARTHRÓLOPHIS Trin.

Branching perennials; racemes 2 to few on each peduncle; rachis joints slender, mostly pubescent; sessile spikelet awned.

14. *Andropogon gerárdi* Vitman. BIG BLUESTEM. (Fig. 1153.) Plants often glaucous; culms robust, often in large tufts, sometimes with short rhizomes, 1 to 2 m. tall, usually sparingly branching toward the summit; lower sheaths and blades sometimes villous, occasionally densely so, the blades flat, elongate, mostly 5 to



FIGURE 1151.—*Andropogon rhizomatus*, × 1. (Type.)



FIGURE 1152.—*Andropogon stolónifer*, × 1. (Fredholm, 6122 Fla.)

10 mm. wide, the margins very scabrous; racemes on the long-exserted terminal peduncle mostly 3 to 6, fewer on the branches, 5 to 10 cm. long, usually purplish, sometimes yellowish; rachis straight, the joints and pedicels stiffly ciliate on one or both margins, the joints hispid at base; sessile spikelet 7 to 10 mm. long, the first glume slightly sulcate, usually scabrous, the awn geniculate and tightly twisted below, 1 to 2 cm. long; pedicellate spikelet not



FIGURE 1153.—*Andropogon gerardi*. Plant, $\times \frac{1}{2}$; pair of spikelets, $\times 5$. (Amer. Gr. Natl. Herb. 255, D. C.)

reduced, or but slightly so, awnless, staminate. 2 —(*A. provincialis* Lam. not Retz., *A. furcatus* Muhl.)—Dry soil, prairies and open woods, Quebec and Maine to Saskatchewan and Montana, south to Florida, Wyoming, Utah, and Arizona; Mexico. An important forage grass in the prairie States of the Mississippi Valley, and a constituent of prairie hay.

15. *Andropogon hallii* Hack. SAND BLUESTEM. (Fig. 1154.) Resembling *A. gerardi*, but with creeping rhizomes; racemes conspicuously villous, the hairs grayish to pale golden; awn of sessile spikelet rarely more than 5 mm. long, often obsolete. 2 —Sand hills and sandy soil, North Dakota and eastern Montana to Texas, Wyoming, Utah, and Arizona; Iowa. Intergrades with *A. gerardi*. A form with yellow-villous racemes and awns 5 to 10 mm. long has been segregated as *A. chrysocomus* Nash.

16. *Andropogon mohrii* (Hack.) Hack. ex Vasey. (Fig. 1155.) Culms stout, compressed, tufted, erect, 80 to 130 cm. tall, the upper half sparingly to rather freely branching; leaves villous, the lower sheaths



FIGURE 1155.—*Andropogon mohrii*, $\times 1$. (Mohr, Ala.)

strongly keeled and glabrous at base, the blades elongate, 3 to 5 mm. wide; inflorescence narrow, the branches approximate, the ultimate branchlets short, densely bearded at summit, the purplish spathes 4 to 6 cm. long;



FIGURE 1154.—*Andropogon hallii*, $\times 1$. (Hitchcock 584, Kans.)



FIGURE 1156.—*Andropogon cabanisii*, $\times 1$. (Fredholm 6416, Fla.)

racemes mostly 4, tawny, 2 to 4 cm. long, on peduncles mostly about 2 cm. long, or the terminal ones sometimes long-exserted; rachis scarcely flexuous, the joints shorter than the spikelets, copiously long-villous; sessile spikelet 4 to 5 mm. long, the awn loosely twisted below, 1.5 to 2 cm. long; pedicel long-villous, the spikelet reduced to a minute glume. 24 —Wet pine woods and sandy seacoast, Virginia to Georgia and Louisiana.



FIGURE 1157.—*Andropogon ternarius*, $\times 1$. (Chase 4557, N. C.)

17. *Andropogon cabanísii* Hack. (Fig. 1156.) Culms in small tufts, erect, 80 to 150 cm. tall, the upper half bearing long slender branches; sheaths villous to nearly glabrous; blades 2 to 3 mm. wide; inflorescence loose; racemes 2, pale grayish tawny, with about 15 joints, 4 to 7 cm. long, on slender long-exserted peduncles, the spathes narrow, inconspicuous, or a few occasionally dilated; rachis not flexuous or but slightly so, the joints

shorter than the spikelets, long-villous; sessile spikelets 6 to 7 mm. long, the first glume firm, scabrous and often 2-nerved between the keels, the awn twisted below, about 1.5 cm. long; pedicel long-villous, the spikelet reduced to a slender glume or obsolete. 24 —Dry pine woods, peninsular Florida.

18. *Andropogon ternarius* Michx. (Fig. 1157.) Culms tufted, erect, 80 to 120 cm. tall, the upper half to two-thirds branching, the branches usually long, slender and erect; leaves often purplish-glaucous, glabrous, or the lower loosely villous, the blades 2 to 4 mm. wide; inflorescence elongate, loose, of few to many pairs of silvery to creamy or grayish feathery racemes, usually on long-exserted peduncles from slender inconspicuous spathes, some of the lateral peduncles often short, from dilated spathes, rarely most of them so; racemes 3 to 6 cm. long, with mostly less than 12 joints, the rachis not flexuous, the joints shorter than the spikelets, copiously long-villous; sessile spikelets 5 to 7 mm. long, glabrous and nerveless between the keels, the awn twisted below, 1.5 to 2 cm. long;



FIGURE 1158.—*Andropogon arctatus*, $\times 1$. (Chapman, Fla.)

stamens 3; pedicel long-villous, the spikelet obsolete or nearly so. 2 — Dry sandy soil, open woods, mostly Coastal Plain, Delaware to Kentucky and Kansas, south to Florida and Texas. Variable in the density and length of pubescence on the rachis and pedicels, the less hairy specimens verging toward *A. arctatus*.

19. *Andropogon arctatus* Chapm. (Fig. 1158.) Resembling *A. ternarius*; culms 1 to 1.5 m. tall; the blades often wider and firmer; branches of the inflorescence rather more slender; racemes 3 to 5 cm. long, tawny; sessile spikelets 4 to 5 mm. long, brown, the awn 1 to 5 cm. long; first glume concave, the pale or tawny hairs of rachis and pedicels shorter and less copious than in *A. ternarius*; sessile spikelet 5 mm. long, 0.5 mm. wide, the glume grooved; stamen 1. 2 — Low pine woods, Florida.

20. *Andropogon floridanus* Scribn. (Fig. 1159.) Culms often stout, 1 to 1.8 m. tall; the upper one-third to half bearing long slender branches; blades elongate, 2 to 6 mm. wide; inflorescence loosely subcorymbose of usually numerous pairs of silvery-

white to creamy racemes on subcapillary peduncles, mostly 2 to 8 cm. long, included in very slender spathes or exserted, the ultimate branchlets filiform, often long-ciliate toward the summit; racemes 3 to 4 cm. long, the slender rachis not flexuous, the joints a little shorter than the spikelets, rather copiously long-villous; sessile spikelets 4 to 4.5 mm. long, the delicate awn straight, 6 to 10 mm. long; pedicel long-villous, the spikelet obsolete. 2 —



FIGURE 1159.—*Andropogon floridanus*, $\times 1$. (Type coll.)



FIGURE 1160.—*Andropogon tracyi*, $\times 1$. (Type.)

Low pine woods, Florida. An occasional peduncle bears 3 racemes.

21. *Andropogon trácyi* Nash. (Fig. 1160.) Culms in small tufts, slender, erect, the upper third sparingly branching; sheaths keeled, narrow, glabrous or nearly so; blades 2 to 3 mm. wide, sometimes ciliate toward base; inflorescence of 8 to 10 relatively distant racemes, the slender ultimate branches often recurved,

cence on the average less compound, the racemes mostly 3, more copiously long-villous, the spikelets 4 to 4.5 mm. long. ♀ —Pine woods, Georgia and Florida. Intergrades with *A. virginicus*.

23. *Andropogon perangustátus* Nash. (Fig. 1162.) Culms in small tufts, slender, wiry, erect, the upper third to half sparingly branching; lower sheaths keeled, very narrow,



FIGURE 1161.—*Andropogon longiberbis*, $\times 1$. (Garber, Fla.)



FIGURE 1162.—*Andropogon perangustatus*, $\times 1$. (Fredholm 6072, Fla.)

the dilated spathes 4 to 6 cm. long, attenuate below, the enclosed peduncle 1 to 3 cm. long; ultimate branchlets long-bearded toward the summit; racemes 2 or 3, feathery, 2 to 4 cm. long, the very slender flexuous rachis and the pedicel copiously long-villous; sessile spikelet about 4 mm. long, the awn loosely twisted below, 1 to 2 cm. long; pedicellate spikelet obsolete. ♀ —Pine woods, Georgia and Florida to Louisiana. Resembling *A. longiberbis*, mostly more slender and with nearly glabrous foliage.

22. *Andropogon longibérbis* Hack. (Fig. 1161.) Resembling *A. virginicus*; sheaths, especially of the innovations, appressed grayish-villous; inflores-

occasionally sparsely villous; ligule about 1.5 mm. long, firm; blades mostly folded, subfiliform, flexuous, glabrous or rarely pilose; inflorescence slender, of few to several racemes, resembling that of slender specimens of *A. virginicus*, the peduncles usually short but the spathes sometimes attenuate to base, the peduncle 1 to 2 cm. long; racemes as in *A. virginicus*. ♀ —Bogs and moist pine woods, Florida and Mississippi.

24. *Andropogon brachýstachys* Chapm. (Fig. 1163.) Culms tufted, erect, 1 to 1.5 m. tall, the upper half loosely branching; sheaths crowded at base, broad, strongly keeled; blades mostly folded, 4 to 6 mm.

wide; inflorescence decompound, loose, the ultimate capillary branchlets commonly recurved, long-villous toward the summit; spathes slender, the long peduncles often exerted from the summit; racemes 2, flexuous, mostly 1 to 1.5 cm. long, the rachis joint and pedicel long-villous; sessile spikelet about 4 mm. long, the awn scarcely 1 cm. long. 21 —Moist pine woods, southern Georgia and Florida. The racemes are frequently affected by a smut, making them shorter and denser, reducing the size of the spikelet and the awn. The inflorescence resembles that of *A. capillipes*, but the racemes mostly more numerous; the ultimate branchlets are long-villous toward the summit and the spikelets larger.

25. *Andropogon capillipes* Nash. (Fig. 1164.) Plants conspicuously glaucous; culms tufted, slender, erect, 60 to 100 cm. tall, the upper third to half with few to several slender branches; sheaths crowded at base,



FIGURE 1164.—*Andropogon capillipes*, $\times 1$. (Curtiss 3638b, Fla.)

keeled, chalky-glaucous; blades mostly folded, 2 to 4 mm. wide; inflorescence narrow but loose, the branches often flexuous to zigzag, the ultimate capillary branchlets finally spreading or recurved, glabrous, the dilated purplish-brown spathes 2 to 3.5 cm. long, glabrous; racemes 2, less flexuous than in *A. virginicus*, 1 to 2.5 cm. long; rachis joint about half as long as the sessile spikelet, the pedicel about equaling the spikelet, both copiously long-villous; sessile spikelet 3 mm. long, the delicate straight awn about 1 cm. long. 21 —Sandy pine and oak woods, southern North Carolina, South Carolina, and Florida.

26. *Andropogon virginicus* L. BROOMSEDGE. (Fig. 1165.) Culms erect, 50 to 100 cm. tall, usually in rather small tufts, the upper two-thirds mostly freely branching; lower sheaths compressed, keeled, equitant; sheaths glabrous or more or less pilose along the margins, occasionally conspicuously so; ligule strongly ciliate; blades flat or folded, 2 to 5 mm. wide, pilose on the upper surface toward base; inflorescence elongate, narrow, the 2 to 4 racemes 2 to 3 cm. long, partly included and shorter than the inflated tawny to bronze



FIGURE 1163.—*Andropogon brachystachys*, $\times 1$. (Curtiss 3632, Fla.)



FIGURE 1165.—*Andropogon virginicus*. Plant, $\times \frac{1}{2}$; spikelet with rachis joint and pedicel, $\times 5$. (Earle 4, Ala.)

spathes; rachis very slender, flexuous, long-villous; sessile spikelet about 3 mm. long, the delicate straight awn 1 to 2 cm. long; pedicel long-villous, its spikelet obsolete or nearly so. 2

—Open ground, old fields, open woods, sterile hills, and sandy soil, Massachusetts, New York, Michigan, and Kansas, south to Florida and Texas; California; Mexico, Central America, West Indies. *ANDROPOGON VIRGINICUS* var. *HIRSÚTIOR* (Hack.) Hitchc. Flowering branches more numerous than in the species, the inflorescence often rather dense, resembling that of *A. glomeratus*, but the spathes mostly larger and the peduncles usually shorter. 2

—Moist meadows and old fields, Florida to Texas; Tennessee; Oklahoma; Mexico. Intergrades with *A. virginicus* and appears to be intermediate between that and *A. glomeratus*. *ANDROPOGON VIRGINICUS* var. *GLAUCÓPSIS* (Ell.) Hitchc. Resembling the species, but foliage, especially the lower sheaths, very glaucous; inflorescence sometimes as dense as in var. *hirsutior*, the spathes dull purple. 2 (*A. glaucopsis* Nash.)—Moist sandy soil and low pine barrens, Virginia to Florida and Mississippi.

27. *Andropogon glomeratus* (Walt.) B. S. P. BUSHY BEARDGRASS. (Fig. 1166.) Culms erect, 50 to 150 cm. tall, compressed, with broad keeled overlapping lower sheaths, the flat tufts often forming dense, usually glaucous clumps, the culms from freely to bushy-branching toward the summit; sheaths occasionally villous; blades elongate, 3 to 8 mm. wide; inflorescence dense, feathery, from flabellate to oblong, the paired racemes 1 to 3 cm. long, about equaling the slightly dilated spathes, the enclosed peduncle and ultimate branchlets long-villous, the peduncle at least 5 mm. long, often longer; rachis very slender, flexuous, long-villous; sessile spikelets 3 to 4 mm. long, the awn straight, 1 to 1.5 cm. long; sterile spikelet reduced to a subulate



FIGURE 1166.—*Andropogon glomeratus*, branchlet of inflorescence, $\times 1$. (Hitchcock 437, Fla.)

glume or wanting, the pedicel slender, long-villous. 2 —Low moist ground, marshes, and swamps, Massachusetts to Florida, west to Ken-



FIGURE 1167.—*Andropogon elliotii*, $\times 1$. (Commons 115, Del.)

tucky, southern California, and Nevada; West Indies, Yucatan, Central America.

28. *Andropogon elliottii* Chapm.
ELLIOTT BEARDGRASS. (Fig. 1167.) Culms tufted, erect, 30 to 80 cm. tall, at first nearly simple, later branching toward the summit; lower sheaths keeled, rather narrow, commonly loosely pilose, those near the summit inflated and spathe-like, crowded, the very short internodes densely bearded; blades flat, 3 to 4 mm. wide; primary inflorescence of few to several racemes, mostly in pairs, rarely threes or fours, on filiform, often strongly flexuous peduncles, long-exserted from inconspicuous spathes, these on slender branchlets borne in the axils of the broad spathe-like sheaths of the main culm; secondary inflorescence of numerous pairs of racemes on short peduncles subtended by broad spathes, these on short, bearded, often fascicled, branchlets borne in the axils of the spathe-like sheaths of the main culm and short primary branches, the whole forming a series of flabellate tufts with conspicuous purplish to copper-brown spathes, 5 to 10 mm. wide, much exceeding the feathery racemes; racemes flexuous, 3 to 4 rarely to 5 cm. long, the slender rachis joints and pedicels long-villous; sessile spikelets 4 to 5 mm. long, those of the late enclosed racemes cleistogamous, the awn loosely twisted, 10 to 15 mm. long; pedicellate spikelets obsolete or nearly so. 2l
—Open ground, old fields, and open woods, mostly on the Coastal Plain, New Jersey to Florida and Texas, north to southern Missouri, Illinois, Indiana, and Ohio; British Honduras. The flattened ferruginous upper sheaths are conspicuous in winter. The characteristic plant is very striking, but occasional individuals occur with less aggregate upper sheaths, and others with scarcely dilated sheaths, aggregate or scarcely aggregate. This form, which has been distinguished as *A. elliottii* var. *graci-*

lior Hack., appears to merge into *A. subtenuis* Nash.

29. *Andropogon subtenuis* Nash.
(Fig. 1168.) Culms in small tufts, slender, erect, 40 to 70 cm. tall, the upper third sparingly branching; foliage glabrous or nearly so, the blades 1.5 to 2 mm. wide; inflorescence narrow, of few to several pairs of racemes on elongate filiform peduncles short-exserted from near the



FIGURE 1168.—*Andropogon subtenuis*, X 1. (Tracy 4701, Miss.)

summit of the elongate slender spathe, the ultimate branches sometimes long-villous toward the summit; racemes 2, flexuous, 2 to 3 cm. long,

very like the primary racemes of *A. elliottii*; spikelets 4 mm. long. ♀ —Dry sandy soil, northern Florida to Louisiana. Possibly a form of *A. elliottii* in which the enlarged sheaths and cleistogamous inflorescence are not developed.

30. *Andropogon campyloracheus* Nash. (Fig. 1169.) Culms tufted, erect, 40 to 80 cm. tall, simple or with a few branches about the middle;



FIGURE 1169.—*Andropogon campyloracheus*, × 1.
(Combs 677, Fla.)

sheaths and lower part of the blades appressed-villous, the blades about 2 mm. wide; racemes 2 to 4, mostly 2, on long flexuous peduncles exserted from long narrow spathes, the slender rachis very flexuous, the joints and pedicels much longer than the sessile spikelet, long-villous, the lowermost rachis joint often elongate; sessile spikelet 5 to 6 mm. long, slender, the awn loosely twisted, mostly about 2 cm. long; pedicellate spikelet reduced to a slender glume or obsolete. ♀ —Dry sandy pine woods, Florida, Mississippi, and Louisiana.

SECTION 3. AMPHILOPHIS Trin.

Perennials, simple or sparingly branching; racemes several to numerous in a leafless panicle, at least the lower racemes short-peduncled, mostly on a relatively long axis, rachis straight, the joints and pedicels flat, with thick bearded margins, the center subhyaline.

31. *Andropogon wrightii* Hack. (Fig. 1170.) Plants somewhat glaucous; culms tufted, 50 to 100 cm. tall, simple, the nodes usually hispid; blades flat, 3 to 5 mm. wide, tapering to a fine point; racemes 3 to 7, suberect, mostly 3 to 6 cm. long, green or tawny, not conspicuously woolly, the hairs of rachis joints and pedicels much shorter than the spikelets; peduncle usually long-exserted; sessile spikelet about 6 mm. long, short-pilose at base, the first glume several-nerved toward the summit, stiffly short-ciliate on the keels above; awn twisted below, geniculate, 10 to 15 mm. long; pedicellate spikelet about as large as the sessile one, awnless. ♀ —Rocky hills and mesas, southern New Mexico, and northern Mexico. An occasional spikelet is found with a pitted first glume. In Mexican specimens the glumes are commonly pitted.

32. *Andropogon perforatus* Trin. ex Fourn. (Fig. 1171.) Culms densely tufted, geniculate at base, 50 to 100 cm. tall, simple or with a few leafy shoots at base; nodes from obscurely appressed-pubescent to densely short-bearded; blades 2 to 4 mm. wide, the apex attenuate; racemes few to several, mostly 5 to 7 cm. long, one or more of them on slender individual peduncles aggregate on a short axis, the common peduncle usually long-exserted; margins of rachis joints and pedicels densely long-villous; sessile spikelet 4 to 6 mm. long, short-pilose at base, the first glume sparsely hairy and with a small pit like a pinhole; awn twisted below, geniculate, 2 to 2.5 cm. long; pedicellate spikelet reduced. ♀ —Mesas, rocky



FIGURE 1170.—*Andropogon wrightii*, $\times 1$. (Metcalf 1371, N. Mex.)

hills, and dry woods, southern Texas; Mexico.

33. *Andropogon barbinódis* Lag. (Fig. 1172.) Culms tufted, 40 to 120 cm. tall, spreading to ascending, often branching below, the nodes bearded with short spreading hairs; sheaths sparsely hairy in the throat, foliage



FIGURE 1171.—*Andropogon perforatus*, $\times 1$. (Hitchcock 5218, Tex.)

otherwise glabrous or nearly so, the blades 2 to 7 mm. wide, scabrous; panicles from rather long-exserted to included at base, those of the branches often partly included in dilated sheaths, silvery to creamy white, silky, subflabellate, mostly 7 to 10 cm. long; racemes several to many, or sometimes few on the branches, 2 to 6 cm. long, the common axis usually shorter than the racemes, rarely longer; rachis joints and pedicels copiously long-villous, the hairs on the average longer than in *A. saccharoides*; spikelets 5 to 6 mm. long, the awn twisted below, geniculate, 20 to 25 mm. long; pedicellate spikelet reduced. ♀ —Mesas, rocky slopes, and open ground, Oklahoma and Texas to California and Arizona, south through Mexico. Has been confused with *A. saccharoides*, differing chiefly in the subflabellate panicle and larger spikelets.

34. *Andropogon saccharoides* Swartz. SILVER BEARDGRASS. (Fig. 1173.) Culms tufted, 60 to 130 cm. tall, erect or ascending, often branching below, the nodes from appressed hispid to glabrous; foliage commonly glaucous, glabrous or nearly so, the blades 3 to 6 mm. wide; panicle long-exserted or those of the branches short-exserted, silvery white, silky, dense, oblong, mostly 7 to 15 cm. long; racemes 2 to 4 cm. long, the common axis mostly at least twice as long, but readily breaking; rachis joints and pedicels long-villous; spikelets about 4 mm. long, the delicate awn twisted below, geniculate, 10 to 15 mm. long; pedicellate spikelet reduced. ♀ —Prairies and rocky slopes, especially in limestone areas, Missouri to Colorado, and Alabama to Arizona; Mexico and West Indies to Brazil. Our plants, which have been differentiated as *A. torreyanus* Steud., are more freely branching than the typical form of the West Indies.

35. *Andropogon exaristátus* (Nash) Hitchc. (Fig. 1174.) Resembling *A. saccharoides*; panicle slender, spike-



FIGURE 1172.—*Andropogon barbinodis*. Plant, $\times \frac{1}{2}$; pair of spikelets, $\times 5$. (Amer. Gr. Natl. Herb. 549, Ariz.)



FIGURE 1173.—*Andropogon saccharoides*, $\times 1$. (Hitchcock 5370, Tex.)

lets slightly smaller, awnless or nearly so; rare. ♀ —Low open ground, southern Louisiana and eastern Texas.

***Andropogon pertusus* (L.) Willd.** Culms ascending, branching; racemes few to several, aggregate on a short axis, sparsely villous; first glume pitted; awn of sessile spikelet geniculate, 10 to 15 mm. long. ♀ —A troublesome weed in lawns and pastures, State College, Miss.; West Indies; introduced from the Old World.

***Andropogon sericeus* R. Br.** Culms slender, leafy, 50 to 80 cm. tall, branching; nodes bearded; racemes 2 to 7, aggregate, 3 to 5 cm. long, nodding from a very slender peduncle,

conspicuously silky; sessile and pedicellate spikelets about equal, the first glumes strongly several-nerved; awn of sessile spikelet twisted, geniculate, 20 to 30 mm. long. ♀ —Spontaneous on roadside banks, Cameron County, Tex. Introduced from Australia.

***Andropogon nodosus* (Willem.) Nash.** Culms ascending from a decumbent base, leafy, branching; nodes bearded; peduncle villous below the inflorescence; racemes 1 to 4, approximate, the sterile spikelets as conspicuous as the fertile, giving the appearance of a flat 2-ranked scaly spike, the first glume broad, obtuse, many-nerved; awns slender, twisted and bent, 15 to 25 mm. long. ♀ —Cultivated at experiment stations, spontaneous along ditches in southeast Texas, and formerly near Miami, Fla. Has been confused with *A. annulatus* Forsk., cultivated under that name, and called "Angleton grass." Established in a few of the West Indian islands. Introduced from Old World tropics.

***Andropogon ischaemum* L.** Culms ascending, 70 to 100 cm. tall; nodes glabrous; racemes nodding, few to several, on slender peduncles aggregate or somewhat distant on a slender axis 3 to 5 cm. long, the sterile spikelets as conspicuous as the fertile, the rachis and pedicels silky-ciliate; awns slender, twisted and bent, about 15 mm. long. ♀ —Cultivated at experiment stations, reported to be a promising pasture grass in southern



FIGURE 1174.—*Andropogon exaristatus*, $\times 5$. (Type.)

Texas; adventive in Kansas, Knoxville, Tenn., and in wool waste, Yonkers, N. Y.

CYMBOPÓGON Spreng. OILGRASS

Closely allied to *Andropogon*; the pairs of racemes included in an inflated spathe, the spathes in a large compound inflorescence; sessile and pedicellate spikelets of lower pair alike, well developed, but staminate or neuter. Robust mostly aromatic perennials, including the oilgrasses of commerce. The most important are

FIGURE 1175.—*Vetiveria zizanioides*, $\times \frac{1}{2}$. (Hitchcock 9435, Jamaica.)



CYMOPOGON NÁRDUS (L.) Rendle, citronella grass, nard grass, in which the first glume of the sessile spikelet is flat on the back and, C. CITRÁTUS (DC.) Stapf, lemon grass, in which the first glume is concave on the back. These species are sometimes cultivated in gardens in southern Florida and southern California but do not flower there. Name from Greek *kumbe*, boat, and *pogon*, beard, alluding to the boat-shaped spathes.

VETIVÉRIA Bory

Vetiveria zizanioides (L.) Nash. VETIVER. (Fig. 1175.) Robust densely tufted perennial with simple culms and large erect panicles, the slender whorled branches ascending, naked at base, the awnless spikelets muricate. Also called khus-khus and khas-khas. ♀ —Native of the Old World, frequently cultivated in tropical America for hedges and for the aromatic roots, these being used for making screens and mats which are fragrant when wet. Vetiver oil is much used in perfumery. Escaped

from cultivation in Louisiana. Name from *vettiver*, the native Tamil name.

155. HYPARRHÉNIA Anderss. ex Stapf

Spikelets in pairs as in *Andropogon*, but spikelets of the lower pairs alike, sterile, and awnless; fertile spikelets 1 to few in each raceme, terete or flattened on the back (keeled toward the summit in *Hyparrhenia rufa*); the base usually elongate into a sharp callus, the fertile lemma with a strong geniculate awn; sterile spikelets awnless; racemes in pairs, on slender peduncles, and subtended by a spathe. Tall perennials, the pairs of racemes and their spathes more or less crowded, forming a rather large elongate inflorescence. Type species, *Hyparrhenia pseudocymbaria* (Steud.) Stapf. Name from Greek *hypo*, under, and *arren*, masculine, alluding to the pair of staminate spikelets at the base of the raceme.

1. Hyparrhenia rufa (Nees) Stapf. (Fig. 1176.) Culms erect, rather stout, 1 to 2.5 m. tall; blades flat,



FIGURE 1176.—*Hyparrhenia rufa*, × 1.
(Moldenke 243, Fla.)

elongate, 2 to 8 mm. wide, sometimes wider, very scabrous on the margins; inflorescence 20 to 40 cm. long, the pairs of racemes on long slender flexuous peduncles; racemes about 2 cm. long, reddish brown; fertile spikelets mostly 5 to 7 in each raceme, 3 to 4 mm. long, flattened from the back, pubescent with dark-red hairs, the pedicels and rachis joint ciliate with red hairs; awn 15 to 20 mm. long, twice geniculate, twisted, red brown, hispidulous. 2 — Tropics of the Old World; introduced in tropical America; sparingly culti-

vated in Florida (where it has escaped) and along the Gulf coast. Adapted to conditions in the regions mentioned, but only moderately valuable as a forage grass. The native name in Brazil is jaraguá.

Hyparrhenia hirta (L.) Stapf. Usually not more than 1 m. tall; blades usually less than 3 mm. wide, more or less involute, flexuous; racemes whitish or grayish silky-villous. 2 — Warmer parts of the Old World; cultivated at the Florida State Experiment Station and probably elsewhere. Appears to have little forage value.

156. SÓRGHUM Moench

Spikelets in pairs, one sessile and fertile, the other pedicellate, sterile but well developed, usually staminate, the terminal sessile spikelet with two pedicellate spikelets. Tall or moderately tall annuals or perennials, with flat blades and terminal panicles of 1- to 5-jointed tardily disarticulating racemes. Type species, *Sorghum saccharatum* (L.) Moench. Name from *Sorgho*, the Italian name of the plant.

The sorghums and Johnson grass sometimes produce cyanogenetic compounds in sufficient abundance, especially in second growth, to cause prussic-acid poisoning in grazing animals. The leaves are often splotched with purple, due to a bacterial disease.

Plants perennial..... 1. *S. halepense*.
Plants annual..... 2. *S. vulgare*.

1. *Sorghum halepense* (L.) Pers.
JOHNSON GRASS. (Fig. 1177.) Culms 50 to 150 cm. tall, from extensively creeping scaly rhizomes; blades mostly less than 2 cm. wide; panicle open, 15 to 50 cm. long; sessile spikelet 4.5 to 5.5 mm. long, ovate, appressed-silky, the readily deciduous awn 1 to 1.5 cm. long, geniculate, twisted below; pedicellate spikelet 5 to 7 mm. long, lanceolate. 2 (*Holcus halepensis* L.)—Open ground, fields, and waste places, Massachusetts to Iowa and Kansas, south to Florida and Texas, west to southern California; native of the Mediterranean region found in the tropical and warmer regions of both hemispheres. Cultivated for forage, but on account of the difficulty of eradication it becomes a troublesome weed.

2. *Sorghum vulgare* Pers. SORGHUM.¹⁶ Differing from *S. halepense*

in being annual and more robust. ☉ (*Holcus sorghum* L.)—This species has been cultivated in warmer regions since prehistoric times for the seed, which has been used for food, for the sweet juice, and for forage. In the United States it is cultivated under the general name of sorghum.

There are many varieties or races of cultivated sorghums, all of which have the same chromosome number (10) and which fall naturally into distinct groups, the chief of which (in the United States) are sorgo, kafir, durra, milo, feterita, shallu, kaoliang, and broomcorn. Sorgo includes the varieties known collectively as sweet or saccharine sorghums, in which the juice in the stems is

¹⁶ For elaboration of cultivated sorghums see SNOWDEN, J. D., THE CULTIVATED RACES OF SORGHUM. vii + 272 pp. 1936. London.



FIGURE 1177.—*Sorghum halepense*. Plant, $\times \frac{1}{2}$; two views of terminal raceme, $\times 5$. (Small, Ga.)

abundant and very sweet. In this country sorgho is cultivated chiefly in the region from Kansas and Texas to North Carolina for forage and for the juice which is made into sirup. The large panicles of broomcorn,

grown especially in Oklahoma and Illinois, furnish the material for brooms. The other forms are grown for forage or for the seed which is used for feed. Chicken corn (*S. vulgare* var. *DRUMMÓNDII* (Nees) Hack. ex Chiov.), described from New Orleans, La., was early introduced from Africa and became naturalized in Mississippi and Louisiana, but is apparently dying out. Culms up to 2 m. tall; blades to 5 cm. wide; panicle elongate, narrow but loose. Near railway, Illinois; weed in cotton field, Alabama; Mississippi; California; rare.

The differences between most of the varieties are so indistinct and so unstable because of intercrossing as to make it very difficult to assign descriptive limits. The application of botanical names is uncertain, and it seems best, therefore, not to assign to them definite varietal or specific Latin names.

The following names have been applied in American literature to some of the more important varieties.

Kafir. *S. vulgare* var. *caffrorum* (Retz.) Hubb. and Rehder.

Shallu. *S. vulgare* var. *roxburghii* (Stapf) Haines.

Durra. *S. vulgare* var. *durra* (Forsk.) Hubb. and Rehder.

Broomcorn. *S. vulgare* var. *technicum* (Koern.) Jav.

Sorgo. *S. vulgare* var. *saccharatum* (L.) Boerl.

Tunis grass (*S. virgatum* (Hack.) Stapf) is a tall annual with a narrow

slender open panicle and narrowly-lanceolate green finely awned spikelets. Africa. Has been tried at experiment stations, but has not been brought into commercial cultivation, being inferior to Sudan grass.

Sorghum lanceolatum Stapf. Robust annual to 1.5 m. tall; blades 30 to 60 cm. long, 2 to 3.5 cm. wide; panicle 25 to 40 cm. long with ascending branches; rachis joints and pedicels ciliate; spikelets about 6 mm. long, silky-pubescent, becoming glabrous and shining on the lower half; awn about 1 cm. long. ☉ — Becoming a weed at Yuma, Calif. Introduced from tropical Africa.

Sorghum sudanense (Piper) Stapf. SUDAN GRASS. Annual, branching from the base, 2 to 3 m. tall; blades 15 to 30 cm. long, 8 to 12 mm. wide; panicle erect, loose, 15 to 30 cm. long, about half as wide, the branches subverticillate, the lower half or third naked; sessile spikelet 6 to 7 mm. long, lanceolate-ovate, a ring of hairs at base, sparsely appressed-silky toward the apex; awn persistent, 10 to 15 mm. long, geniculate, twisted below; pedicellate spikelet narrow, about as long as the sessile spikelet, strongly nerved. ☉ (*Sorghum vulgare* var. *sudanense* Hitchc.)—Extensively cultivated for pasture and hay and escaped in the Southern and Midwestern States and in Arizona and California. Originally from Anglo-Egyptian Sudan.

157. SORGHÁSTRUM Nash

Spikelets in pairs, one nearly terete, sessile, and perfect, the other wanting, only the hairy pedicel being present; glumes coriaceous, brown or yellowish, the first hirsute, the edges inflexed over the second; sterile and fertile lemmas thin and hyaline, the latter extending into a usually well-developed bent and twisted awn. Perennial, erect, rather tall grasses, with auricled sheaths, narrow flat blades, and narrow terminal panicles of 1- to few-jointed racemes. Type species, *Sorghastrum avenaceum* (Michx.) Nash (*S. nutans*). Name from *Sorghum* and the Latin suffix *astrum*, a poor imitation of, alluding to the resemblance to *Sorghum*.

The most important species, *S. nutans*, is a common constituent of wild or prairie hay in the eastern part of the Great Plains region.

Awn usually 15 mm. long or less, once geniculate. Panicle rather dense, yellowish.

1. *S. NUTANS*.



FIGURE 1178.—*Sorghastrum nutans*. Plant, $\times \frac{1}{2}$; spikelet with pedicel and rachis joint, $\times 5$. (Deam, Ind.)

Awn 20 to 35 mm. long, twice-geniculate, twisted below the second bend.

Spikelets chestnut-brown, the ultimate branchlets with a few long hairs at the tip only; panicle loose, not unilateral..... 2. *S. ELLIOTTII*.

Spikelets yellowish brown, the upper portion of the ultimate branchlets conspicuously long-hairy toward the tip; panicle distinctly unilateral..... 3. *S. SECUNDUM*.

1. *Sorghastrum nutans* (L.) Nash.

INDIAN GRASS. (Fig. 1178.) Culms 1 to 2.5 m. tall from short scaly rhizomes; blades elongate, flat, mostly 5 to 10 mm. wide, tapering to a narrow base, scabrous; panicle narrow, yellowish, rather dense, 15 to 30 cm. long, contracted and darker at maturity; summit of branchlets, rachis joints, and pedicels grayish-hirsute; spikelets 6 to 8 mm. long, lanceolate, hirsute, the awn 1 to 1.5 cm. long, once-geniculate. ♀ — Prairies, open woods, and dry slopes, Quebec and Maine to Manitoba and North Dakota, south to Florida and Arizona; Mexico.

2. *Sorghastrum elliottii* (Mohr)

Nash. (Fig. 1179.) Culms 1 to 1.5 m. tall, more slender than in *S. nutans*, without rhizomes; the base comparatively delicate, smooth or nearly so; blades on the average narrower; panicle loose, 15 to 30 cm. long, nodding at apex, the filiform branchlets and pedicels flexuous but not recurved, with a few long hairs at the tip; spikelets 6 to 7 mm. long, chestnut brown at maturity, with a short blunt bearded callus, the first glume hirsute or glabrescent on the back; awn 2.5 to 3.5 cm. long, twice-geniculate. ♀ — Open woods dry hills, and sandy fields, eastern Maryland to Tennessee, south to Florida and Texas.

3. *Sorghastrum secundum* (Ell.)

Nash. (Fig. 1180.) Culms 1 to 2 m. tall, without rhizomes, the base robust and felty-pubescent; blades mostly less than 5 mm. wide, flat or subinvolute; panicle narrow, 20 to 40 cm. long, 1-sided, the branches mostly in separated fascicles, the capillary branchlets and pedicels strongly curved or circinately recurved, stiffly long-pilose below the tip; spikelets about 7 mm. long, brownish, pilose, with an acute dense-



FIGURE 1179.—*Sorghastrum elliottii*, $\times 1$. (Harper 1718, Ga.)

ly bearded callus 1 to 1.5 mm. long. ♀ — Pine barrens, South Carolina to Florida and Texas.



FIGURE 1180.—*Sorghastrum secundum*, $\times 1$. (Hood, Fla.)



FIGURE 1181.—*Chrysopogon pauciflorus*. Plant, $\times \frac{1}{2}$; fruiting spikelet, $\times 5$. (Combs 1359, Fla.)

158. CHRYSOPÓGON Trin.

(Rhaphis Lour.)

Spikelets in threes, one sessile and perfect, the other two pedicellate and sterile, or sometimes a pair below, one fertile and one sterile; fertile spikelet terete, the glumes coriaceous; sterile and fertile lemmas thin and hyaline, the latter awned. Perennial grasses, or, our species, annual, with open panicles, the three spikelets (reduced raceme) borne at the ends of long, slender, naked branches. Type species, *Andropogon gryllus* L. Name from Greek *chrysos*, golden, *pogon*, beard.

1. Chrysopogon pauciflorus (Chapm.) Benth. ex Vasey. (Fig.

1181.) Annual; culms 60 to 120 cm. tall, erect or somewhat decumbent at base; blades flat, mostly 4 to 8 mm. wide; panicle loose, the axis 5 to 10 cm. long, the branches few, very slender, 5 to 8 cm. long; sessile spikelet about 1.5 cm. long, including the slender villous callus about 7 mm. long, this disarticulating by a long-oblique line, the tip of the pedicel thus villous on one side; awn stout, brown, geniculate, twisted below, about 15 cm. long. ☉ —Sandy pine woods, open ground, and fields, Florida; Cuba. The fertile spikelets resemble the fruits of certain species of *Stipa*, such as *S. spartea* L.

159. HETEROPÓGON Pers.

Spikelets in pairs, one sessile, the other pedicellate, both of the lower few to several pairs staminate or neuter, the remainder of the sessile spikelets perfect, terete, long-awned, the pedicellate spikelets, like the lower, staminate, flat, conspicuous, awnless; glumes of the fertile spikelet equal, coriaceous, the first brown-hirsute, infolding the second; lemmas thin and hyaline, the fertile one narrow, extending into a strong bent and twisted brown awn; palea wanting; glumes of the staminate spikelet membranaceous, the first green, faintly many-nerved, asymmetric, one submarginal keel rather broadly winged, the other wingless, the margins inflexed, the second glume narrower, symmetric; lemmas hyaline; palea wanting. Annual or perennial, often robust grasses, with flat blades and usually solitary terminal racemes; rachis slender, the lower part, bearing the pairs of staminate spikelets, continuous, the remainder disarticulating obliquely at the base of each joint, the joint forming a sharp-barbed callus below the fertile spikelet, the pedicellate spikelet readily falling, its pedicel remaining obscured in the hairs of the callus. Type species, *Heteropogon glaber* Pers. (*H. contortus*). Name from Greek *heteros*, different, and *pogon*, beard, alluding to the difference between the awnless-staminate and awned-pistillate spikelets.

One species, *H. contortus*, has a world-wide distribution. It is a good forage grass in the Southwest; if grazed constantly the troublesome awns do not develop. In the Hawaiian Islands, where it is called pili, it is an important range grass on the drier areas; also used there by the natives to thatch their grass huts. The mature fruits are injurious to sheep.

Plants perennial, less than 1 m. tall; first glume of staminate spikelet usually papillose-hispid..... 1. *H. CONTORTUS*.

Plants annual, usually more than 1 m. tall; first glume of staminate spikelet with a row of glands along the back, glabrous..... 2. *H. MELANOCARPUS*.

1. Heteropogon contortus (L.)

Beauv. ex Roem. and Schult. **TANGLE-HEAD.** (Fig. 1182.) Plants perennial, tufted; culms 20 to 80 cm. tall, branched above, the branches erect;

sheaths smooth, compressed-keeled; blades flat or folded, 3 to 7 mm. wide; raceme 4 to 7 cm. long, 1-sided; sessile spikelets about 7 mm. long,



FIGURE 1182.—*Heteropogon contortus*. Plant, $\times \frac{1}{2}$; fruiting spikelet, $\times 5$. (Griffiths 1844, Ariz.)

slender, nearly hidden by the imbricate pedicellate spikelets, the awns 5 to 12 cm. long, bent and flexuous, commonly tangled; pedicellate spike-

let about 1 cm. long, the first glume papillose-hispid toward the tip and margins, sometimes nearly glabrous. ♀ —Rocky hills and canyons, Texas to Arizona; tropical and warmer regions of both hemispheres.

2. *Heteropogon melanocarpus* (Ell.) Benth. SWEET TANGLEHEAD. (Fig. 1183.) Plants annual, 1 to 2 m. tall, freely branching; sheaths smooth, the upper part of the keel, especially of the upper sheaths, with a row of concave glands; blades 5 to 10 mm. wide; raceme 3 to 6 cm. long; looser than in *H. contortus*; sessile spikelets 9 to 10 mm. long, relatively thick, the awns 10 to 15 cm. long; pedicellate spikelet 1.5 to 2.5 cm. long, the first glume with a line of punctate glands along the middle. ☉ —Pine woods, fields, and waste places, Georgia, Florida, and Alabama; Arizona; tropical regions of both hemispheres. The plant when fresh emits an odor like that of citronella oil.



FIGURE 1183.—*Heteropogon melanocarpus*, $\times 1$
(Fredholm 6405, Fla.)

160. TRACHYPÓGON Nees

Spikelets in pairs, along a slender continuous rachis, one nearly sessile, staminate, awnless, the other pedicellate, perfect, long-awned; the pedicel of the perfect spikelet obliquely disarticulating near the base, forming a sharp-barbed callus below the spikelet; first glume firm-membranaceous, rounded on the back, several-nerved, obtuse; second glume firm, obscurely nerved; fertile lemma narrow, extending into a stout twisted and bent or flexuous awn; palea obsolete; sessile spikelet persistent, as large as the fertile spikelet and similar but awnless. Perennial, moderately tall grasses, with terminal spikelike solitary or fascicled racemes. Type species, *Trachypogon montufari*. Name from Greek *trachus*,

rough, and *pogon*, beard, alluding to the plumose awn of the fertile spikelet.

1. *Trachypogon secúndus* (Presl) Scribn. CRINKLE-AWN. (Fig. 1184.) Culms tufted erect, slender, 60 to 120 cm. tall, the nodes appressed hirsute; sheaths with erect auricles 2 to 5 mm. long; blades flat to sub-involute, 3 to 8 mm. wide; raceme solitary, 10 to 18 cm. long, the rachis glabrous; spikelets 6 to 8 mm. long, pubescent, the awns of perfect spikelets 4 to 6 cm. long, short-plumose below, nearly glabrous toward the tip. ♀ (Included in *T. montufari* (H. B. K.) Nees in the Manual, ed. 1.)—Rocky hills and canyons, southern Texas, southwestern New Mexico, and southern Arizona; Mexico to Argentina.

161. ELYONÚRUS Humb. and Bonpl. ex Willd.

Spikelets in pairs along a somewhat tardily disarticulating rachis, the joints and pedicels short, thickened, and parallel, the sessile spikelets perfect, appressed to the concave side, the pedicellate spikelet staminate, similar to the sessile one, both awnless, the pair falling with a joint of the rachis; first glume



FIGURE 1184.—*Trachypogon secundus*. Plant, $\times \frac{1}{2}$; fertile spikelet, $\times 5$. (Griffiths and Thornber 300, Ariz.)

firm, somewhat coriaceous, dorsally flattened, the margins inflexed around the second glume, a line of balsam glands on the marginal nerves, the apex entire and acute or acuminate, or bifid with aristate teeth; second glume similar to the first; sterile and fertile lemmas thin and hyaline; palea obsolete. Erect, moderately tall perennials, with solitary spikelike, often woolly racemes. Type species, *Elyonurus tripsacoides*. Name from Greek *eluein*, to roll, and *oura*, tail, alluding to the cylindric inflorescence.

The species are important grazing grasses in the savannas and plains of tropical America, but they extend only a short distance into the United States.

Rhizomes wanting; culms hirsute below the nodes; racemes conspicuously woolly.

1. *E. BARBICULMIS*.

Rhizomes present; culms glabrous; racemes slightly pubescent, the first glume glabrous or nearly so on the back..... 2. *E. TRIPSACOIDES*.

1. *Elyonurus barbiculmis* Hack. (Fig. 1185.) Culms tufted, erect, simple or sparingly branching, 40 to 60 cm. tall, pubescent below the nodes; blades involute, striate, about 1 mm. thick, the upper surface usually long-pilose; raceme mostly 5 to 10 cm. long, pale; rachis joints, pedicels, and spikelets densely woolly, the spikelets 6 to 8 mm. long; first glume acuminate. 2 —Mesas, rocky hills, and canyons, western Texas to southern Arizona; northern Mexico.

2. *Elyonurus tripsacoides* Humb. and Bonpl. ex Willd. (Fig. 1186.) Culms 60 to 120 cm. tall, glabrous, rather freely branching and with short rhizomes; blades flat or involute, 2 to 4 mm. wide, slightly pilose on the upper surface near the base; raceme 7 to 15 cm. long; rachis joints ciliate, the pedicels pilose; spikelets 6 to 8 mm. long, the first glume ciliate toward the acuminate 2-toothed apex, usually glabrous on the back. 2 —Moist pine woods and low prairies, Georgia, Florida, southern Mississippi, and southern Texas; Mexico to Argentina.

162. *ROTTBOELLIA* L. f.

Spikelets awnless, in pairs at the nodes of a thickened articulate rachis, one sessile and perfect, the other pedicellate, sterile; rachis joints hollow above, the thickened pedicel adnate to it, the pedicellate spikelet appearing to be sessile; sessile spike-



FIGURE 1185.—*Elyonurus barbiculmis*, $\times 1$. (Type coll.)

let fitting closely against the concave side of the rachis joint, the first glume coriaceous, the second less coriaceous; sterile and fertile lemmas and palea hyaline. Coarse branching annual, with broad flat blades and subcylindric racemes, dwindling toward the summit and bearing abortive spikelets only. Type species, *Rottboellia exaltata*. Named for C. F. Rottboell.

1. *Rottboellia exaltata* L. f. (Fig. 1187.) Culms robust, 1 to 3 m. tall, branching; sheaths papillose-hispid, especially toward the summit; blades flat, in robust specimens as much as 3 cm. wide; racemes mostly 8 to 12 cm. long, 3 to 4 mm. thick, dwindling at the summit; sessile spikelet 5 to



FIGURE 1186.—*Elyonurus tripsacoides*. Plant, $\times \frac{1}{2}$; two views of pair of spikelets with rachis joint, $\times 5$. (Chase 4144, Fla.)

7 mm. long; first glume finely papillose; pedicellate spikelet scarcely as long as the sessile one. ☉ (*Manisuris exaltata* Kuntze.)—Introduced

at Miami, Fla.; West Indies; native of tropical Asia. The fragile hairs of the sheaths are irritating to the skin of persons handling the plant.

163. MANISÚRIS L.

Spikelets awnless, in pairs at the nodes of a thickened articulate rachis, one sessile and perfect, the other pedicellate, rudimentary (developed but sterile in *M. altissima*), the pedicel thickened and appressed to the rachis, the sessile spikelet fitting closely against the rachis (sometimes partly adnate in *M. altissima*), forming a cylindric or flattened raceme; glumes mostly obtuse, the first coriaceous, fitting over the hollow containing the spikelet, the keels winged at the summit, the second less coriaceous than the first; sterile lemma, fertile lemma, and palea thin and hyaline. Perennial, slender, moderately tall, or tall grasses, with usually numerous glabrous cylindric or flattened solitary racemes. Type species, *Manisuris myuros* L. Name from Greek *manos*, necklace, and *oura*, tail, presumably alluding to the jointed racemes. The species probably have some forage value but they are nowhere abundant.

Racemes flattened, tardily disarticulating; first glume of sessile spikelet smooth.

1. *M. ALTISSIMA*.

Racemes cylindric, readily disarticulating at maturity; first glume of sessile spikelet marked with pits or wrinkles (sometimes smooth in *M. tuberculosa*).

Sheaths not compressed-keeled; first glume more or less pitted..... 2. *M. CYLINDRICA*.

Sheaths compressed-keeled; first glume tessellated, wrinkled, tubercled, or smooth.

First glume tessellated, the depressions rectangular..... 3. *M. TESSELLATA*.

First glume with prominent transverse wrinkles..... 4. *M. RUGOSA*.

First glume with a few low tubercles or smooth..... 5. *M. TUBERCULOSA*.

1. *Manisuris altissima* (Poir.)

Hitchc. (Fig. 1188.) Perennial; culms ascending from a long creeping base, compressed and 2-edged, 40 to 80 cm. long, freely branching toward the ends; blades flat, 3 to 8 mm. wide; flowering branches often short and fascicled, the racemes 3 to 5 cm., sometimes 10 cm. long, compressed; pedicel free or partly adnate to the rachis joint; sessile spikelet 5 to 7 mm. long, the keels of the first glume very narrowly winged toward the apex; pedicellate spikelet 5 to 6 mm. long, acute. ☉ (*M. fasciculata* Hitchc.)—Ponds and ditches, southern Texas; warm-temperate and tropical regions of both hemispheres; introduced in America.

2. *Manisuris cylindrica* (Michx.)

Kuntze. (Fig. 1189.) Culms tufted, with short rhizomes, erect, rather slender, 30 to 100 cm. tall, simple or



FIGURE 1188.—*Manisuris altissima*, × 1. (Hitchcock, Tex.)

FIGURE 1187.—*Rottboellia exaltata*, × 1. (Ridley, Jamaica.)



FIGURE 1189.—*Manisuris cylindrica*. Plant, $\times \frac{1}{2}$; two views of rachis joint with fertile and sterile spikelets attached, $\times 5$. (Harvey, Ark.)

with a few branches; sheaths not folded, 2 to 3 mm. wide; raceme compressed-keeled; blades flat or cylindric, 5 to 15 cm. long, slightly

curved; sessile spikelet 4 to 5 mm. long, the first glume pitted along the nerves. 2 —Pine woods and prairies, Coastal Plain, North Carolina to Florida and Texas, north to Missouri and Oklahoma.

3. *Manisuris tessellata* (Steud.) Scribn. (Fig. 1190.) Culms 80 to 120 cm. tall, rather stout, branching; sheaths, especially the basal ones, compressed-keeled; blades elongate, flat, mostly 5 to 8 mm. wide; raceme 5 to 12 cm. long; sessile spikelets 4 to 5 mm. long; first glume tessellated with rectangular depressions, the keels narrowly winged at the apex. 2 —Moist pine woods, Coastal Plain, Florida to Louisiana.

4. *Manisuris rugosa* (Nutt.) Kuntze. (Fig. 1191.) Culms mostly rather stout, 70 to 120 cm. tall, freely branching; sheaths compressed-keeled; blades commonly folded, 3 to 8 mm. wide; flowering branches often numerous, the racemes 4 to 8 cm. long, partly included in brownish sheaths; rachis joint and pedicel contracted in the middle; sessile spikelet 3.5 to 5 mm. long, the first glume strongly and irregularly transversely ridged, the keels narrowly winged toward the summit. 2 —Wet pine woods, Coastal Plain, southern New Jersey to Florida, Arkansas, and Texas.

5. *Manisuris tuberculosa* Nash. (Fig. 1192.) Differing from *M. rugosa* chiefly in the straight rachis joints, not contracted in the middle, and in the smooth to obscurely ridged or tuberculate first glume of the sessile spikelet, varying in a single raceme. 2 —Moist ground along lakes, central peninsular Florida. Apparently rare.

Eremóchloa ophiuroides (Munro) Hack. CENTIPEDE GRASS. Low perennial, creeping by thick short-noded leafy stolons; racemes spikelike, smooth, subcylindric, terminal and axillary on slender peduncles, 2 to 6 cm. long; rachis flat, not thickened as in *Manisuris*, the first glume of



FIGURE 1190.—*Manisuris tessellata*, $\times 1$. (Tracy and Ball 1, Miss.)

sessile spikelet winged at summit. 2 —Southeastern Asia; valuable as a lawn grass from South Carolina to Florida, and the Gulf States. It is commonly used in northern Florida, replacing to a large extent carpet grass and St. Augustine grass. It is easily established and quickly forms a dense turf.



FIGURE 1191.—*Manisuris rugosa*, $\times 1$. (Curtiss 3622, Fla.)

FIGURE 1192.—*Manisuris tuberculosa*, $\times 1$. (Nash 1074, Fla.)

EREMOCHLOA CILIÁRIS (L.) Merr. Found near a Chinese warehouse in San Francisco. Southeastern Asia. Mentioned in the Botany of California (2:262. 1880) under *Ischaemum leersioides* Munro. Not since collected in the United States.

nate. Freely branching annual with flat blades, the numerous racemes solitary and more or less enclosed in the spathes, these usually fascicled in the axils of the leaves. Type species, *Hackelochloa granularis*. Named



FIGURE 1193.—*Hackelochloa granularis*. Plant, $\times \frac{1}{2}$; single raceme, $\times 2$; two views of spikelets with rachis joint, $\times 5$. (Pringle, Ariz.)

164. HACKELOCHLOA Kuntze

(*Rytidix* Raf.)

Spikelets awnless, in pairs, the rachis joint and pedicel grown together, the two clasped between the edges of the globose alveolate first glume of the sessile spikelet; pedicellate spikelet conspicuous, stami-

for Eduard Hackel and Greek *chloa*, grass.

1. *Hackelochloa granularis* (L.) Kuntze. (Fig. 1193.) Culms 30 to 100 cm. tall; sheaths papillose-hispid; blades flat, 5 to 15 cm. long, 3 to 15 mm. wide, papillose-hirsute, ciliate; racemes 1 to 2 cm. long; sessile spikelet about 1 mm. thick; pedicellate

spikelet about 2 mm. long. ☉ — Open ground, fields, and waste places, Georgia and Florida to Louisiana; New Mexico to Arizona; tropics of both hemispheres, introduced in America. Furnishes some forage in the Southwest.

THEMÉDA Forsk.

Inflorescence a flabellate cluster of several short racemes, each subtended by a spathe, the entire cluster subtended by a larger spathe; racemes consisting of 2 approximate pairs of sessile awnless staminate or neuter spikelets and a single fertile awned spikelet with a pair of sterile pedicellate ones, the rachis disjointing above the pairs of sessile staminate spikelets and forming a pointed callus below the fertile one. Annuals or perennials. Name from the Arabian, *Thaemed*.

Themeda quadriválvis (L.) Kuntze. KANGAROO GRASS. Robust annual, 1 to 1.5 m. tall; blades flat, elongate, 5 to 10 cm. wide; inflorescence often elongate, narrow, loose to dense, with conspicuous bent brown awns 4 to 5 cm. long. ☉ — Established on bottom land, near Opelousas, St. Landry Parish, La. Introduced in the West Indies. East Indies.

TRIBE 14. TRIPSACEAE

165. CÓIX L. JOBS-TEARS

Spikelets unisexual; staminate spikelets 2-flowered, in twos or threes on the continuous rachis, the normal group consisting of a pair of sessile spikelets with a single pedicellate spikelet between, the latter sometimes reduced to a pedicel or wanting; glumes membranaceous, obscurely nerved; lemma and palea hyaline; stamens 3; pistillate spikelets 3 together, 1 fertile and 2 sterile at the base of the inflorescence; glumes of fertile spikelet several-nerved, hyaline below, chartaceous in the upper narrow pointed part, the first very broad, infolding the spikelet, the margins infolded beyond the 2 lateral stronger

pair of nerves; second glume narrower than the first, keeled, sterile lemma similar but a little narrower; fertile lemma and palea hyaline; sterile spikelets consisting of a single narrow tubular glume as long as the fertile spikelet, somewhat chartaceous. Tall branched grasses with broad flat blades, the monoecious inflorescences numerous on long, stout peduncles, these clustered in the axils of the leaves, each inflorescence consisting of an ovate or oval pearly-white or drab, beadlike, very hard, tardily deciduous involucre (much modified sheathing bract) containing the pistillate lower portion of the inflorescence, the points of the pistillate spikelets and the slender axis of the staminate portion of the inflorescence protruding through the orifice at the apex, the staminate upper portion of the inflorescence 2 to 4 cm. long, soon deciduous, consisting of several clusters of staminate spikelets. Type



FIGURE 1194.—*Coix lacryma-jobi*, × 1. (Cult.)

species, *Coix lacryma-jobi*. Name from Greek *koix*, a kind of palm, applied by Linnaeus to this grass.

1. *Coix lacryma-jobi* L. JOBS-TEARS. (Fig. 1194.) Annual; culms usually about 1 m. tall; blades as much as 4 cm. wide; beads white to bluish gray, globular or ovoid, 6 to 12 mm. long. ☉ —Occasionally

cultivated for ornament, escaped into waste places in the Southern States; all tropical countries; introduced in America. The beadlike fruits are used as beads and for rosaries. A garden form (called by gardeners var. *aurea zebrina*) has yellow-striped blades.

166. *TRIPSACUM* L. GAMAGRASS

Spikelets unisexual; staminate spikelets 2-flowered, in pairs on one side of a continuous rachis, one sessile, the other sessile or pedicellate, similar to those of *Zea*, the glumes firmer; pistillate spikelets solitary (a minute rudiment of a sterile spikelet sometimes found), on opposite sides at each joint of the thick, hard articulate lower part of the same rachis, sunken in hollows in the joints, consisting of one perfect floret and a sterile lemma; first glume coriaceous, nearly infolding the spikelet, fitting into and closing the hollow of the rachis; second glume similar to the first but smaller, infolding the remainder of the spikelet; sterile lemma, fertile lemma, and palea very thin and hyaline, these progressively smaller. Robust perennials, with usually broad flat blades and monoecious terminal and axillary inflorescences of 1 to 3 racemes, the pistillate part below, breaking up into bony, seedlike joints, the staminate above on the same rachis, deciduous as a whole. Type species, *Tripsacum dactyloides*. Name of unknown origin, said by some to come from Greek *tribein*, to rub, alluding to the smooth joints.

The species are good forage grasses, but even the more widely spread *T. dactyloides* is not common enough to be of importance. Two large species not found in the United States, *T. laxum* Nash and *T. latifolium* Hitchc., of Central America, are occasionally cultivated for forage in that region. The genus is of interest because it is related to maize. Hybrids between *T. dactyloides* and maize have been made.¹⁷

Staminate spikelets membranaceous, the members of the pair unequally pedicellate, one nearly sessile, the other with a distinct pedicel..... 3. *T. LANCEOLATUM*.
Staminate spikelets rather chartaceous, both members of the pair nearly sessile.

Blades 1 to 2 cm. wide, flat; plants 1 to 2 m. tall; terminal racemes usually more than one.

1. *T. DACTYLOIDES*.

Blades 1 to 4 mm. wide, subinvolute; plants less than 1 m. tall; all racemes usually solitary.

2. *T. FLORIDANUM*.

1. *Tripsacum dactyloides* (L.) L. EASTERN GAMAGRASS. (Fig. 1195.) Plants in large clumps, with thick knotty rhizomes, 2 to 3 m. tall or sometimes taller, glabrous throughout; blades usually 1 to 2 cm. wide, flat, scabrous on the margin; inflorescence 15 to 25 cm. long, the pistillate part one-fourth the entire length or less, the terminal racemes usually 2 or 3, sometimes only 1, those of the branches usually solitary; pistillate

spikelets 7 to 10 mm. long, the joints rhombic; staminate spikelets 7 to 11 mm. long, both of a pair nearly sessile, the glumes rather chartaceous. ☉ —Swales, banks of streams, and moist places, Massachusetts to Michigan, Iowa, and Nebraska, south to Florida, Oklahoma, and Texas; West Indies. *TRIPSACUM DACTYLOIDES* var. *OCCIDENTALE* Cutler and Anders. Differentiated on softer staminate glumes more than 9 mm. long, tapering to an acute tip. ☉ —Texas. Examination of a large number of specimens shows the length and texture of

¹⁷ MANGELSDORF, P. C., and REEVES, R. G. Jour. Hered. 22: 329-343. 1931. Ibid., Texas Agr. Expt. Sta. Bul. 574 (monogr.): 1-315. 1939.



FIGURE 1195.—*Tripsacum dactyloides*. Plant, $\times \frac{1}{2}$; pistillate spikelets with rachis joint and pair of staminate spikelets with rachis joint, $\times 5$. (Amer. Gr. Natl. Herb. 229, Va.)



FIGURE 1196.—*Tripsacum floridanum*, $\times 1$. (Hitchcock 686, Fla.)

staminate glumes to vary greatly, often in a single raceme. Occasional specimens with glumes 10 to 11 mm. long, soft or firm, are found also in Iowa, Missouri, Kansas, Virginia, Tennessee, and Oklahoma, the plants not differing otherwise from the species.

2. *Tripsacum floridanum* Porter ex Vasey. FLORIDA GAMAGRASS. (Fig. 1196.) Smaller than *T. dactyloides* in all ways, commonly less than 1 m. tall; blades mostly 1 to 4 mm. wide; terminal and axillary racemes usually solitary (rarely 2 or more). σ — Low rocky pinelands, southern Florida.

3. *Tripsacum lanceolatum* Rupr. MEXICAN GAMAGRASS. (Fig. 1197.) Resembling *T. dactyloides*; sheaths, especially the lower, sometimes hispid; blades often hispidulous on the upper surface; racemes more slender with smaller spikelets than in *T.*



FIGURE 1197.—*Tripsacum lanceolatum*, $\times 1$. (Lemmon, Ariz.)

dactyloides, the terminal racemes usually 3 to 5; staminate spikelets membranaceous, one of the pair distinctly pediceled. σ (*T. lemmoni* Vasey.) — Rocky hills, Huachuca and Mule Mountains, Ariz.; Mexico to Guatemala.

167. EUCHLAÉNA Schrad.

TEOSINTE

Staminate spikelets as in *Zea*; pistillate spikelets solitary on opposite sides, sunken in cavities in the hardened joints of an obliquely articulate rachis, the indurate first glume covering the cavity; second glume membranaceous, the lemma hyaline. Spikes infolded in foliaceous spathes or husks, 2 to several of these together enclosed in the leaf sheaths. Robust annuals and perennials with



FIGURE 1198.—*Euchlaena mexicana*. Plant, much reduced; pistillate inflorescence enclosed in bract (a) and with portion of bract removed (b), $\times 1$; lateral view of rachis joint and fertile spikelet (c), and dorsal view of same, showing first glume (d), $\times 2$. (Cult.)

broad flat blades, terminal panicles of staminate spikelets, and axillary spikes of pistillate spikelets. Type species, *Euchlaena mexicana*. Name from Greek *eu*, well, and *chlaina*, cloak, alluding to the husks hiding the pistillate inflorescence.

1. *Euchlaena mexicana* Schrad. TEOSINTE. (Fig. 1198.) Tall annual, resembling maize, the culms branching at base, 2 to 3 or even 5 m. tall; blades as much as 8 cm. wide. ☉ —Occasionally cultivated in the Southern States for green forage; Mexico. Closely related to maize and readily hybridizing with it.

2. *Euchlaena perennis* Hitchc., MEXICAN TEOSINTE, a perennial species from Mexico, is cultivated at the substation of the agricultural college, Angleton, Tex., Sacaton, Ariz., and probably at other points. Established on James Island, S. C. It propagates by creeping rhizomes.

168. ZÉA L.

Spikelets unisexual; staminate spikelets 2-flowered, in pairs, on one side of a continuous rachis, one nearly sessile, the other pedicellate; glumes membranaceous, acute; lemma and palea hyaline; pistillate spikelets sessile, in pairs, consisting of 1 fertile floret and 1 sterile floret, the latter sometimes developed as a second fertile floret; glumes broad, rounded or emarginate at apex; sterile and fertile lemmas hyaline, the palea developed; style very long and slender, stigmatic along both sides well toward the base. Robust annual, with terminal panicles (tassels) of staminate racemes, and short-peduncled, pistillate, 8- to many-rowed spikes (ears) enclosed in numerous spathes (husks). Type species, *Zea mays*. Name Greek *zea*, or *zeia*, a kind of grain.

1. *Zea máys* L. MAIZE, INDIAN CORN. (Fig. 1199.) Tall robust monoe-

cious annual, with overlapping sheaths and broad, conspicuously distichous blades; staminate spikelets in long spikelike racemes, these numerous, forming large spreading terminal panicles; pistillate inflorescence in the axils of the leaves, the spikelets in 8 to 16 or even as many as 30 rows on a thickened, almost woody axis (cob), the whole enclosed in numerous large foliaceous bracts or spathes, the long styles (silk) protruding from the summit as a mass of silky threads; grains at maturity greatly exceeding the glumes. ☉ —Maize or Indian corn is one of the important economic plants of the world, being cultivated for food for man and domestic animals and for forage. It originated¹⁸ in America, probably on the Mexican Plateau, and was cultivated from prehistoric times by the early races of American aborigines, from Peru to middle North America. Several races of maize are grown in the United States,¹⁹ the most important being dent, the common commercial field sort, flint, sweet, and pop. Pod corn (*Z. mays* var. *tunicata* Larr. ex St. Hil.), occasionally cultivated as a curiosity, is a variety in which each kernel is enveloped in the elongate glumes. A variety with variegated leaves (*Z. mays* var. *japonica* (Van Houtte) Wood) is cultivated for ornament.

¹⁸ For a note on the origin of maize, see COLLINS, G. N. THE ORIGIN OF MAIZE. Jour. Wash. Acad. Sci. 2: 520-530. 1912.

¹⁹ See the following publications:

MANGELSDORF, P. C. and REEVES, R. G. THE ORIGIN OF INDIAN CORN AND ITS RELATIVES. Tex. Agr. Expt. Sta. Bul. 574 (monogr.): 1-315. 1939. REEVES, R. G. and MANGELSDORF, P. C. Amer. Jour. Bot. 29: 815-817. 1942. STURTEVANT, E. L. VARIETIES OF CORN. U. S. Dept. Agr., Off. Expt. Sta. Bul. 57, 108 pp. 1899. TAPLEY, W. T., ENZIE, W. D., and VAN ESELTIME, G. P., N. Y. State Agr. Expt. Sta. Rpt., 1934. 1934. WEATHERWAX, PAUL, MORPHOLOGY OF THE FLOWERS OF ZEA MAYS. Torrey Bot. Club Bul. 43: 127-144. 1916. DEVELOPMENT OF SPIKELETS OF ZEA MAYS. Torrey Bot. Club Bul. 43: 483-496. 1917; THE EVOLUTION OF MAIZE. Torrey Bot. Club Bul. 45: 309-342. 1918; THE STORY OF THE MAIZE PLANT. 247 pp. illus. Chicago, Ill., 1923; THE PHYLOGENY OF ZEA MAYS. Amer. Midl. Nat. 16: 1-71. 1935.



FIGURE 1199.—*Zea mays*. Pistillate inflorescence (ear) and 2 branches of staminate inflorescence (tassel), $\times \frac{1}{2}$; pair of pistillate spikelets attached to rachis (cob) with mature grains, the second glume showing, $\times 2$; single pistillate spikelet soon after flowering, $\times 4$; staminate spikelet, $\times 2$. (Cult.)

SYNONYMY

The following names have appeared in botanical literature as applied to grasses growing in the United States. For grasses introduced into the United States from other countries there are here given only the names appearing in American works. No attempt has been made to present the complex synonymy for these introduced grasses given in foreign works. The synonymy for the generic names will be found in The Genera of Grasses of the United States. Genera not included in this work nor in Manual, ed. 1, and a few changes in generic names will be found in the Appendix, page 1001.

For quick reference the names of genera and valid species are arranged in alphabetic order, the names in blackface type. The synonyms, in italics, are arranged chronologically under the names to which they are referred. The numbers in parentheses are the numbers these genera and species bear in the body of this work.

(44) AEGILOPS L.

- (1) **Aegilops cylindrica** Host, Icon. Gram. Austr. 2: 6. pl. 7. 1802. Southern Europe.

Triticum cylindricum Ces., Pass. and Gib., Comp. Fl. Ital. 86. 1867. Presumably based on *Aegilops cylindrica* Host.

- (3) **Aegilops ovata** L., Sp. Pl. 1050. 1753. Southern Europe.

Triticum ovatum Raspail, Ann. Sci. Nat., Bot. 5: 435. 1825. Based on *A. ovata* L.

- (2) **Aegilops triuncialis** L., Sp. Pl. 1051. 1753. Mediterranean region.

Triticum triunciale Raspail, Ann. Sci. Nat., Bot. 5: 435. 1825. Based on *A. triuncialis* L.

(96) AEGOPOGON Humb. and Bonpl. ex Willd.

- (1) **Aegopogon tenellus** (DC.) Trin., Gram. Unif. 164. 1824. Based on *Lamarckia tenella* DC., though Trinius cites not that but *A. pusillus* Beauv., in Roem. and Schult., Syst. Veg. 2: 805. 1817. Roemer and Schultes cite *L. tenella* DC., obviously the basis of Trinius' name, as synonym of *A. pusillus* Beauv., which, however, is the same as *A. cenchroides* Humb. and Bonpl. (not known from the U. S.).

Lamarckia tenella DC., Cat. Hort. Monsp. 120. 1813. Grown in Montpellier, origin unknown, probably Mexico.

Cynosurus tenellus Cav. ex DC., Cat. Hort. Monsp. 120. 1813, as synonym of *Lamarckia tenella* DC.

Hymenothecium unisetum Lag., Gen. and Sp. Nov. 4. 1816. Grown from Mexican seed sent by Sessé.

Hymenothecium tenellum Lag., Gen. and Sp. Nov. 4. 1816. Based on *Cynosurus tenellus* Cav.

Aegopogon unisetus Roem. and Schult., Syst. Veg. 2: 805. 1817. Based on *Hymenothecium unisetum* Lag.

Schellingia tenera Steud., Flora 33: 232. 1850. Mexico, Galeotti 5750.

Aegopogon geminiflorus var. *unisetus* Fourn., Mex. Pl. 2: 71. 1886. Based on *A. unisetus* Roem. and Schult.

Chloris pedicellata Steud. ex Fourn., Mex. Pl. 2: 71. 1886, as synonym of *A. geminiflorus* H. B. K. Misapplied by Fournier.

Aegopogon geminiflorus var. *abortivus* Fourn. Mex. Pl. 2: 71. 1886. Bourgeau 750 bis and Schaffner 7, both in the Paris Herbarium and cited by Fournier have been examined. Both are short-awned specimens of *A. tenellus*.

Aegopogon tenellus var. *abortivus* Beetle, Wyo. Univ. Pub. 13²: 18. 1948. Based on *A. geminiflorus* var. *abortivus* Fourn.

(42) AGROPYRON Gaertn.

- (9) **Agropyron albicans** Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 32. 1897. Yogo Gulch, Mont., Rydberg 3405.

- (20) **Agropyron arizonicum** Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 27. 1897. New Mexico, Arizona [type, Rincon Mountains, Nealley 67], and Chihuahua, Mexico.

Agropyron caninum var. *majus* Scribn., Torrey Bot. Club Bul. 10: 32. 1883. Santa Rita Mountains, Ariz., Pringle.

Agropyron spicatum var. *arizonicum* Jones, West. Bot. Contrib. 14: 19. 1912. Based on *A. arizonicum* Scribn. and Smith.

Elymus arizonicus Gould, Madroño 9: 125. 1947. Based on *Agropyron arizonicum* Scribn. and Smith.

- (15) **Agropyron bakeri** E. Nels., Bot. Gaz. 38: 378. 1904. Pagosa Peak, Colo., Baker 139.

Agropyron caninum (L.) Beauv., Ess. Agrost. 102, 146. 1812. Based on *Triticum caninum* L.

Triticum caninum L., Sp. Pl. 86. 1753. Europe.

Elymus caninus L., Fl. Suec. ed. 2. 39. 1755. Based on *Triticum caninum* L.

Zeia canina Lunell, Amer. Midl. Nat. 4: 226. 1915. Based on *Triticum caninum* L.

- Roegneria canina* Nevski in Komarov, Fl. U. R. S. S. 2: 617. 1934. Based on *Triticum caninum* L.
- (7) *Agropyron cristatum* (L.) Gaertn., Nov. Comm. Petrop. 14: 540. 1770. Based on *Bromus cristatus* L.
- Bromus cristatus* L., Sp. Pl. 78. 1753. Northern Asia.
- Triticum cristatum* Schreb., Besch. Gras. 2: 12. pl. 23. f. 2. 1769. Based on *Bromus cristatus* L.
- Avena cristata* Roem. and Schult., Syst. Veg. 2: 758. 1817, as synonym of *Agropyron cristatum* Gaertn.
- Costia cristata* Willk. Bot. Ztg. 16: 377. 1858. Based on *Bromus cristatus* L.
- Eremopyrum cristatum* Willk. and Lange, Prodr. Fl. Hisp. 1: 108. 1870. Presumably based on *Bromus cristatus* L.
- Zeia cristata* Lunell, Amer. Midl. Nat. 4: 226. 1915. Based on *Agropyron cristatum* Gaertn.
- (6) *Agropyron dasystachyum* (Hook.) Scribn. Torrey Bot. Club Bul. 10: 78. 1883. Based on *Triticum repens* var. *dasystachyum* Hook.
- Triticum repens* var. *dasystachyum* Hook., Fl. Bor. Amer. 2: 254. 1840. Saskatchewan, Richardson. The type has villous lemmas.
- Triticum repens* var. *subvillosum* Hook., Fl. Bor. Amer. 2: 254. 1840. Mackenzie River, Canada, Richardson. The type has scabrous-pubescent lemmas.
- Triticum dasystachyum* A. Gray, Man. 602. 1848. Based on *T. repens* var. *dasystachyum* Hook.
- Agropyron dasystachyum* var. *subvillosum* Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 33. 1897. Based on *Triticum repens* var. *subvillosum* Hook.
- Agropyron lanceolatum* Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 34. 1897. Idaho [type, Blackfoot, Palmer 266], Washington and Oregon.
- Triticum repens acutum* Vasey ex Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 34. 1897, as synonym of *A. lanceolatum* Scribn. and Smith.
- Agropyron subvillosum* E. Nels., Bot. Gaz. 38: 378. 1904. Based on *Triticum repens* var. *subvillosum* Hook.
- Zeia dasystachyum* Lunell, Amer. Midl. Nat. 4: 226. 1915. Based on *Triticum repens* var. *dasystachyum* Hook.
- Elymus subvillosus* Gould, Madroño 9: 127. 1947. Based on *Triticum repens* var. *subvillosum* Hook.
- Elymus lanceolatus* Gould, Madroño 10: 94. 1949. Presumably based on *Agropyron lanceolatum* Scribn. and Smith. Not *Elymus dasystachys* Trin., 1829.
- (1) *Agropyron desertorum* (Fisch.) Schult., Mantissa 2: 412. 1824. Based on *Triticum desertorum* Fisch.
- Triticum desertorum* Fisch. ex Link, Enum. Pl. 1: 97. 1821. Desert Cumano [along River Kuma, southeastern European Russia].
- (7) *Agropyron elmeri* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 11: 54. pl. 12. 1898. Snake River, Wash., Elmer 759.
- (10) *Agropyron griffithsi* Scribn. and Smith ex Piper, Biol. Soc. Wash. Proc. 18: 148. 1905. North Fork Clear River, Wyo., Williams and Griffiths 140.
- (19) *Agropyron inerme* (Scribn. and Smith) Rydb., Torrey Bot. Club Bul. 36: 539. 1909. Based on *A. divergens* var. *inerme* Scribn. and Smith.
- Agropyron divergens* var. *inerme* Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 27. 1897. British Columbia to Utah and Idaho [type Henderson 3058].
- Agropyron spicatum inerme* Heller, N. Amer. Pl. Cat. ed. 2. 3. 1900. Based on *Agropyron divergens* var. *inerme* Scribn. and Smith.
- Agropyron intermedium* (Host) Beauv., Ess. Agrost. 102, 146. 1812. Based on *Triticum intermedium* Host.
- Triticum intermedium* Host, Gram. Austr. 3: 23. 1805. Austria.
- Triticum glaucum* Desf. ex DC., Fl. Franc. 5: 281. 1815. Not *T. glaucum* Moench, 1794. France.
- Agropyron glaucum* Roem. and Schult., Syst. Veg. 2: 752. 1817. Based on *Triticum glaucum* Desf.
- Braconotia glauca* Godr., Fl. Lorr. 3: 192. 1844. Based on *Triticum glaucum* Desf.
- Agropyron repens glaucum* Scribn., Torrey Bot. Club Mem. 5: 57. 1894. Based on *Triticum glaucum* Desf., but misapplied to *A. smithii* Rydb.
- Zeia glauca* Lunell, Amer. Midl. Nat. 4: 226. 1915. Based on *Triticum glaucum* Desf., but misapplied to *A. smithii* Rydb.
- Elytrigia intermedia* Nevski, Akad. Nauk S. S. S. R. Bot. Inst. Trudy I. (Acad. Sci. U. R. S. S. Inst. Bot. Acta I. Flora et Syst. Plant. Vasc.) 1: 14. 1933. Based on *Triticum intermedium* Host.
- Agropyron junceum* (L.) Beauv., Ess. Agrost. 102, 146, 180. 1812. Based on *Triticum junceum* L.
- Triticum junceum* L., Mant. Pl. 2: 327. 1771. Europe.
- Festuca juncea* Moench, Meth. Pl. 190. 1794. Based on *Triticum junceum* L.
- Braconotia juncea* Godr., Fl. Lorr. 3: 192. 1844. Based on *Triticum junceum* L.
- Elytrigia juncea* Nevski, Akad. Nauk S. S. S. R. Bot. Inst. Trudy I. (Acad. Sci. U. R. S. S. Inst. Bot. Acta I. Flora et Syst. Plant. Vasc.) 1: 17. 1933; 2: 83. 1936. Based on *Triticum junceum* L.
- Elymus multinodus* Gould, Madroño 9: 126. 1947. Based on *Triticum junceum* L., not *Elymus junceus* Fisch.
- The names *Agropyron junceum* and *A.*

intermedium are here applied in accord with Ascherson and Graebner (Syn. Mitteleur. Fl. 2: 654, 662. 1901) under *Triticum*. *Triticum junceum* L. (Cent. Pl. 1: 6. 1755; Amoen. Acad. 4: 266. 1759), which seems to have been generally ignored, appears to be the same as *T. intermedium* Host. Linnaeus later (Mant. Pl. 2: 327. 1771) published a different species under the same name. This second name is the one used by Ascherson and Graebner and other European botanists. The problem involves study of European types not here available.

- (14) **Agropyron latiglume** (Scribn. and Smith) Rydb., Torrey Bot. Club Bul. 36: 539. 1909. Based on *A. violaceum* var. *latiglume* Scribn. and Smith.

Agropyron violaceum var. *latiglume* Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 30. 1897. Montana [type, Lone Mountain, Gallatin County, Tweedy 1011] to Alaska.

Agropyron biflorum latiglume Piper, Torrey Bot. Club Bul. 32: 547. 1905. Based on *A. violaceum* var. *latiglume* Scribn. and Smith.

Agropyron caninum var. *latiglume* Pease and Moore, Rhodora 12: 73. 1910. Based on *A. violaceum* var. *latiglume* Scribn. and Smith.

Roegneria latiglumis Nevski, Akad. Nauk S. S. S. R. Bot. Inst. Trudy I. (Acad. Sci. U. R. S. S. Inst. Bot. Acta I. Flora et Syst. Plant. Vasc.) 2: 55. 1936. Based on *Agropyron latiglume* Rydb.

- (21) **Agropyron parishii** Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 28. 1897. San Bernardino Mountains, Calif., *Parish* 2054.

Elymus stebbinsii Gould, Madroño 9: 126. 1947. Based on *Agropyron parishii* Scribn. and Smith, not *Elymus parishii* Davy and Merr.

AGROPYRON PARISHII var. *laeve* Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 28. 1897. Cuyamaca Mountains, Calif., *Palmer* 414.

Agropyron laeve Hitchc. in Jepson, Fl. Calif. 1: 181. 1912. Based on *A. parishii* var. *laeve* Scribn. and Smith.

Elymus pauciflorus subsp. *laeve* Gould, Madroño 9: 126. 1947. Based on *Agropyron parishii* var. *laeve* Scribn. and Smith.

- (16) **Agropyron pringlei** (Scribn. and Smith) Hitchc. in Jepson, Fl. Calif. 1: 183. 1912. Based on *A. gmelini* var. *pringlei* Scribn. and Smith.

*Agropyron gmelini*²⁰ var. *pringlei* Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 31. 1897. Wyoming

and California [type, Summit Valley, *Pringle* in 1882].

Agropyron caninum var. *gmelini* forma *pringlei* Pease and Moore, Rhodora 12: 76. 1910. Based on *A. gmelini* var. *pringlei* Scribn. and Smith.

Agropyron spicatum var. *pringlei* Jones, West. Bot. Contrib. 14: 19. 1912. Based on *A. gmelini* var. *pringlei* Scribn. and Smith.

Elymus sierrus Gould, Madroño 9: 125. 1947. Based on *Agropyron gmelini* var. *pringlei* Scribn. and Smith, not *Elymus pringlei* Scribn. and Merr., 1901.

- (4) **Agropyron pseudorepens** Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 34. 1897. Texas and Arizona to Nebraska [type, Kearney, *Rydberg* 2018], Montana and British Columbia.

Agropyron pseudorepens var. *magnum* Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 35. 1897. Enterprise, Colo., *Rydberg* 2401.

Agropyron tenerum magnum Piper, Torrey Bot. Club Bul. 32: 546. 1905. Based on *A. pseudorepens* var. *magnum* Scribn. and Smith.

Agropyron tenerum var. *pseudorepens* Jones, West. Bot. Contrib. 14: 19. 1912. Based on *A. pseudorepens* Scribn. and Smith.

Zeia pseudorepens Lunell, Amer. Midl. Nat. 4: 226. 1915. Based on *Agropyron pseudorepens* Scribn. and Smith.

Elymus pauciflorus subsp. *pseudorepens* Gould, Madroño 10: 94. 1949. Based on *Agropyron pseudorepens* Scribn. and Smith.

- (3) **Agropyron pungens** (Pers.) Roem. and Schult., Syst. Veg. 2: 753. 1817. Based on *Triticum pungens* Pers.

Triticum pungens Pers., Syn. Pl. 1: 109. 1805. England.

Triticum repens var. *pungens* Duby in DC., Bot. Gall. 1: 529. 1828. Based on *T. pungens* Pers.

Braconotia pungens Godr., Fl. Lorr. 3: 192. 1844. Based on *Triticum pungens* Pers.

Agropyron repens subsp. *pungens* Hook. f., Stud. Fl. ed. 3: 504. 1884. Based on *A. pungens* Roem. and Schult.

Agropyron tetrastachys Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 32. 1897. Cape Elizabeth, Maine, *Scribner* in 1895.

Elymus pauciflorus subsp. *pseudorepens* Gould, Madroño 10: 94. 1949. Based on *Agropyron pseudorepens* Scribn. and Smith.

- (2) **Agropyron repens** (L.) Beauv., Ess. Agrost. 102, 146, 180. pl. 20, f. 2. 1812. Based on *Triticum repens* L.

Triticum repens L., Sp. Pl. 86. 1753. Europe.

Triticum infestum Salisb., Prodr. Stirp. 27. 1796. Based on *T. repens* L.

²⁰ *Triticum caninum* var. *gmelini* Griseb. in Ledeb., Icon. Pl. Ross. 3: 16. pl. 248. 1831, the basis of *Agropyron gmelini* Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 30. 1897, and of *A. caninum* var. *gmelini* Pease and Moore, Rhodora 12: 75. 1910, is a Siberian species not known from North America. See note under *A. subsecundum*.

- ?*Triticum vaillantianum* Wulf. and Schreb. in Schweig. and Körte, Spec. Fl. Erlang. 1: 143. 1804. Germany. [This work not in Washington. From the description in ed. 2. 1: 143. 1811, this appears to be an awned form of *A. repens*.]
- Braconotia officinarum* Godr., Fl. Lorr. 3: 192. 1844. Based on *Triticum repens* L.
- Elytrigia repens* Desv. ex Jacks., Ind. Kew. 1: 836. 1893. Based on *Triticum repens* L.
- Agropyron repens* var. *pilosum* Scribn. in Rand and Redfield, Fl. Mt. Desert 183. 1894. Mount Desert, Maine, Rand.
- Agropyron repens* forma *geniculatum* Farwell, Detroit Commr. Parks and Boul. Ann. Rpt. 11: 48. 1900. Detroit, Mich., Farwell 1635.
- Agropyron repens* forma *stoloniferum* Farwell, Detroit Commr. Parks and Boul. Ann. Rpt. 11: 48. 1900. Detroit, Farwell 1634.
- Zeia repens* Lunell, Amer. Midl. Nat. 4: 227. 1915. Based on *Triticum repens* L.
- Agropyron repens* forma *pilosum* Fernald, Rhodora 35: 184. 1933. Based on *A. repens* var. *pilosum* Scribn.
- Agropyron repens* var. *subulatum* forma *heberhachis* Fernald, Rhodora 35: 184. 1933. Yarmouth, Nova Scotia, Long and Linder 20,091.
- Agropyron repens* var. *subulatum* forma *setiferum* Fernald, Rhodora 35: 184. 1933. Chelsea Beach, Mass., Boott in 1868.
- ?*Agropyron repens* var. *subulatum* forma *vaillantianum* Fernald, Rhodora 35: 184. 1933. Based on *Triticum vaillantianum* Wulf. and Schreb.
- Elymus repens* Gould, Madroño 9: 127. 1947. Based on *Triticum repens* L.
- Agropyron leersianum* (Wulf.) Rydb. (Brittonia 1: 85. 1931), based on "*Triticum repens leersianum* Wulfen" (apparently error for *T. leersianum* Wulf.) is applied to awned specimens of *A. repens*. The name, ultimately based on a description and figure named "*Elymus caninus* L." by Leers (Fl. Herborn. 46. pl. 12. f. 4. 1775), is uncertain. The figure, showing paired spikelets, appears to represent a species of *Elymus*.
- (8) *Agropyron riparium* Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 35. 1897. Montana [type, Garrison, Rydberg 2127].
- Agropyron smithii* var. *riparium* Jones, West. Bot. Contrib. 14: 19. 1912. Based on *A. riparium* Scribn. and Smith.
- Zeia riparia* Lunell, Amer. Midl. Nat. 4: 227. 1915. Based on *Agropyron riparium* Scribn. and Smith.
- Elymus riparius* Gould, Madroño 9: 127. 1947. Not *E. riparius* Wiegand, 1918. Based on *Agropyron riparium* Scribn. and Smith.
- Elymus rydbergii* Gould, Madroño 10: 94. 1949. Based on *Agropyron riparium* Scribn. and Smith. Not *Elymus riparius* Wiegand.
- (23) *Agropyron saundersii* (Vasey) Hitchc., Wash. Biol. Soc. Proc. 41: 159. 1928. Based on *Elymus saundersii* Vasey.
- Elymus saundersii* Vasey, Torrey Bot. Club Bul. 11: 126. 1884. Veta Pass, Colo. [Vasey].
- (22) *Agropyron saxicola* (Scribn. and Smith) Piper, U. S. Natl. Herb. Contrib. 11: 148. 1906. Based on *Elymus saxicola* Scribn. and Smith.
- Elymus saxicola* Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 11: 56. pl. 15. 1898. Mt. Chapaca, Wash., Elmer 554.
- Sitanion flexuosum* Piper, Erythea 7: 99. 1899. Wawawai, Wash., Piper 3004.
- Sitanion lanceolatum* J. G. Smith, U. S. Dept. Agr., Div. Agrost. Bul. 18: 20. 1899. Barker, Mont., Rydberg 3381.
- Agropyron flexuosum* Piper, Wash. Biol. Soc. Proc. 18: 149. 1905. Based on *Sitanion flexuosum* Piper.
- Agropyron sitanioides* J. G. Smith in Piper, Wash. Biol. Soc. Proc. 18: 149. 1905. Rapid City, S. Dak., Griffiths 735.
- (17) *Agropyron scribneri* Vasey, Torrey Bot. Club Bul. 10: 128. 1883. Montana, Scribner in 1883.
- Elymus scribneri* Jones, West. Bot. Contrib. 14: 20. 1912. Based on *Agropyron scribneri* Vasey.
- Agropyron semicostatum* (Steud.) Nees ex Boiss., Fl. Orient. 5: 662. 1884. Presumably based on *Triticum semicostatum* Steud.
- Triticum semicostatum* Steud., Syn. Pl. Glum. 1: 346. 1854. Nepal.
- Agropyron japonicum* Tracy, U. S. Dept. Agr., Div. Agrost. Ann. Rpt. 1891: 6. 1892. Name only; Vasey ex Wickson, Calif. Agr. Expt. Sta. Rpt. 1895-1897: 275. pl. 14. f. 1. 1898. Erroneously listed as *Brachypodium japonicum* Miq. by Scribner, U. S. Dept. Agr., Div. Agrost. Bul. 14 (rev.): 22. 1900.
- Roegneria semicostata* Kitag., Manchukuo Inst. Sci. Res. Rpt. 3 (App. I): 91. 1939. Based on *Triticum semicostatum* Steud.
- Agropyron sibiricum* (Willd.) Beauv., Ess. Agrost. 102, 146, 181. 1812. Based on *Triticum sibiricum* Willd.
- Triticum sibiricum* Willd., Enum. Pl. 135. 1809. Siberia.
- (5) *Agropyron smithii* Rydb., N. Y. Bot. Gard. Mem. 1: 64. 1900. (Feb.) Based on *A. spicatum* as described by Scribner and Smith (U. S. Dept. Agr., Div. Agrost. Bul. 4: 33. 1897), ["type *** Geyer, upper Missouri"], not *Festuca spicata* Pursh, upon which they based the name.
- Agropyron glaucum* var. *occidentale* Scribn.,

- Kans. Acad. Trans. 9: 11ⁿ. 1885.
 Kansas. Scribner later (Torrey Bot. Club Mem. 5: 57. 1894) called this *A. repens glaucum*, but he based that name on *Triticum glaucum* Desf.
- Agropyron occidentale* Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 27: 9. 1900. (Dec.) Based on *A. glaucum* var. *occidentale* Scribn.
- Zeia occidentalis* Lunell, Amer. Midl. Nat. 4: 226. 1915. Based on *Agropyron occidentale* Scribn.
- Zeia smithii* Lunell, Amer. Midl. Nat. 4: 227. 1915. Based on *Agropyron smithii* Rydb.
- Agropyron spicatum* var. *viride* Farwell, Mich. Acad. Sci. Rpt. 21: 356. 1920. Detroit, Mich., Farwell 851e.
- Elymus smithii* Gould, Madroño 9: 127. 1947. Based on *Agropyron smithii* Rydb.
- Agropyron smithii* var. *typica* Waterf., Rhodora 51: 21. 1949. Based on *A. smithii* Rydb.
- AGROPYRON SMITHII** var. **MOLLE** (Scribn. and Smith) Jones, West. Bot. Contrib. 14: 18. 1912. Based on *A. spicatum* var. *molle* Scribn. and Smith.
- Agropyron spicatum* var. *molle* Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 33. 1897. Saskatchewan to Colorado, New Mexico, Idaho, and Washington. [Type, Montana, Rydberg 3193.]
- Agropyron molle* Rydb., N. Y. Bot. Gard. Mem. 1: 65. 1900. Based on *A. spicatum* var. *molle* Scribn. and Smith.
- Agropyron occidentale* var. *molle* Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 27: 9. 1900. Based on *A. spicatum* var. *molle* Scribn. and Smith.
- Zeia mollis* Lunell, Amer. Midl. Nat. 4: 226. 1915. Based on *Agropyron spicatum* var. *molle* Scribn. and Smith.
- AGROPYRON SMITHII** var. **PALMERI** Heller, N. Amer. Pl. Cat. ed. 2: 3. 1900. Based on *A. spicatum* var. *palmeri* Scribn. and Smith. (Published as *A. smithii palmeri*.)
- Agropyron spicatum* var. *palmeri* Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 33. 1897. Arizona [type Palmer in 1869] and New Mexico.
- Agropyron occidentale* var. *palmeri* Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 27: 9. 1900. Based on *A. spicatum* var. *palmeri* Scribn. and Smith.
- Agropyron palmeri* Rydb., Colo. Agr. Expt. Sta. Bul. 100: 55. 1906. Based on *A. spicatum* var. *palmeri* Scribn. and Smith.
- (18) **Agropyron spicatum** (Pursh) Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 33. 1897. Based on *Festuca spicata* Pursh, but due to misidentification of Pursh's species, misapplied to *Agropyron smithii* Rydb.
- Festuca spicata* Pursh, Fl. Amer. Sept. 1: 83. 1814. Missouri and Columbia Rivers [type from Columbia River, Lewis and Clark in 1806].
- Schedonorus spicatus* Roem. and Schult., Syst. Veg. 2: 707. 1817. Based on *Festuca spicata* Pursh.
- Triticum divergens* Nees ex Steud., Syn. Pl. Glum. 1: 347. 1854. North America, Douglas.
- Agropyron divergens* Vasey, Deser. Cat. Grasses U. S. 96. 1885. Presumably based on *Triticum divergens* Nees.
- Agropyron divergens* var. *tenue* Vasey, Deser. Cat. Grasses U. S. 96. 1885. Name only; in Macoun, Can. Pl. Cat. 24: 242. 1888. Name only.
- Agropyron divergens* var. *tenuispicum* Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 27. 1897. Washington and Oregon [type, Howell 181] to Wyoming and Montana.
- Agropyron vaseyi* Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 27. 1897. Oregon and Washington to Wyoming and Colorado. [Type, Montana, Rydberg 2299.]
- Agropyron spicatum tenuispicum* Rydb., N. Y. Bot. Gard. Mem. 1: 61. 1900. Based on *A. divergens* var. *tenuispicum* Scribn. and Smith.
- Agropyron spicatum* var. *vaseyi* E. Nels., Bot. Gaz. 38: 378. 1904. Based on *A. vaseyi* Scribn. and Smith.
- Zeia spicata* Lunell, Amer. Midl. Nat. 4: 227. 1915. Based on *Festuca spicata* Pursh.
- Elymus spicatus* Gould, Madroño 9: 125. 1947. Based on *Festuca spicata* Pursh.
- This is the species called *Triticum strigosum* Less., by Thurber (S. Wats., Bot. Calif. 2: 324. 1880), and *Agropyron strigosum* by Coulter (Rocky Mount. Man. 426. 1885, the name erroneously ascribed to Beauv.). Not *T. strigosum* Less., of the Caspian region, nor *A. strigosum* (Bieb.) Boiss. (1884) of Asia Minor.
- AGROPYRON SPICATUM** var. **PUBESCENS** Elmer, Bot. Gaz. 36: 52. 1903. Mount Stuart, Wash., Elmer 1158.
- Agropyron spicatum puberulentum* Piper, U. S. Natl. Herb. Contrib. 11: 147. 1906. Based on *Agropyron spicatum* var. *pubescens* Elmer.
- (12) **Agropyron subsecundum** (Link) Hitchc., Amer. Jour. Bot. 21: 131. 1934. Based on *Triticum subsecundum* Link.
- Triticum subsecundum* Link, Hort. Berol. 2: 190. 1833. Garden plant, seed collected by Richardson in western North America.
- Triticum richardsoni* Schrad., Linnaea 12: 467. 1838. North America.
- Agropyron richardsoni* Schrad., Linnaea 12: 467. 1838, as synonym of *Triticum richardsoni* Schrad.

Cryptopyrum richardsoni Heynh., Nom. 2: 174. 1846, as synonym of *Triticum richardsoni* Schrad.

Agropyron unilaterale Cassidy, Colo. Agr. Expt. Sta. Bul. 12: 63. 1890. Not *A. unilaterale* Beauv., 1812. Colorado.

Agropyron caninum var. *unilaterale* Vasey, U. S. Natl. Herb. Contrib. 1: 279. 1893. Based on *A. unilaterale* Cassidy, though Vasey adds: "Type specimen collected by F. Lamson-Scribner in Montana in 1883 (no. 422)."

Agropyron violaceum forma *caninoides* Ramaley, Minn. Bot. Studies 1: 108. 1894. Minnesota, Macmillan and Sheldon 84.

Agropyron caninum forma *violacescens* Ramaley, Minn. Bot. Studies 1: 107. 1894. Based on *A. caninum* var. *unilaterale* Vasey.

Agropyron violacescens Beal, Grasses N. Amer. 2: 635. 1896. Based on *A. caninum* forma *violacescens* Pound (error for Ramaley).

Agropyron caninoides Beal, Grasses N. Amer. 2: 640. 1896. Based on *A. violaceum* forma *caninoides* Ramaley.

Agropyron caninum var. *pubescens* Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 29. 1897. British Columbia, Macoun 99.

Agropyron richardsoni var. *ciliatum* Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 29. 1897. Montana, Belt Mountains, Scribner in 1883.

Agropyron caninum forma *glaucum* Pease and Moore, Rhodora 12: 71. 1910. Maine, Fernald 1367.

Agropyron caninum var. *unilaterale* forma *ciliatum* Pease and Moore, Rhodora 12: 76. 1910. Based on *A. richardsoni* var. *ciliatum* Scribn. and Smith.

Agropyron caninum var. *richardsoni* Jones, West. Bot. Contrib. 14: 18. 1912. Based on *Triticum richardsoni* "Trin." (error for Schrad.).

Zeia richardsoni Lunell, Amer. Midl. Nat. 4: 227. 1915. Based on *Agropyron richardsoni* Schrad.

Agropyron trachycaulum var. *unilaterale* Malte, Canada Natl. Mus. Ann. Rpt. 1930 (Bul. 68): 46. 1932. Based on *A. unilaterale* Cassidy.

Agropyron trachycaulum var. *ciliatum* Malte, Canada Natl. Mus. Ann. Rpt. 1930 (Bul. 68): 47. 1932. Based on *A. richardsoni* var. *ciliatum* Scribn. and Smith.

Agropyron trachycaulum var. *caerulescens* Malte, Canada Natl. Mus. Ann. Rpt. 1930 (Bul. 68): 47. 1932. Vancouver Island, Malte.

Agropyron trachycaulum var. *glaucum* Malte, Canada Natl. Mus. Ann. Rpt. 1930 (Bul. 68): 47. 1932. Based on *A. caninum* forma *glaucum* Pease and Moore.

Agropyron trachycaulum var. *pilosiglume* Malte, Canada Natl. Mus. Ann. Rpt. 1930 (Bul. 68): 48. 1932. Victoria, Vancouver Island, Macoun.

Agropyron trachycaulum var. *hirsutum* Malte, Canada Natl. Mus. Ann. Rpt. 1930 (Bul. 68): 48. 1932. Victoria, Vancouver Island, Macoun.

Elymus pauciflorus subsp. *subsecundus* Gould, Madroño 9: 126. 1947. Based on *Triticum subsecundum* Link.

This is the species which has been generally called *Agropyron caninum* (L.) Beauv. by American authors. Most of the specimens cited under *A. gmelini* Scribn. and Smith (U. S. Dept. Agr., Div. Agrost. Bul. 4: 30. 1897) belong to *A. subsecundum*, but the name was based in *Triticum caninum* var. *gmelini* Griseb., a Siberian species.

AGROPYRON SUBSECUNDUM VAR. **ANDINUM** (Scribn. and Smith) Hitchc., Amer. Jour. Bot. 21: 132. 1934. Based on *A. violaceum andinum* Scribn. and Smith.

Agropyron violaceum var. *andinum* Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 30. 1897. Colorado. [Type, Grays Peak, Jones 720.]

Agropyron brevifolium Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 11: 55. pl. 13. 1898. Washington, Elmer 676.

Agropyron biflorum andinum Piper, Torrey Bot. Club Bul. 32: 547. 1905. Based on *A. violaceum* var. *andinum* Scribn. and Smith.

Agropyron andinum Rydb., Colo. Agr. Expt. Sta. Bul. 100: 54. 1906. Based on *A. violaceum* var. *andinum* Scribn. and Smith.

Agropyron caninum var. *andinum* Pease and Moore, Rhodora 12: 75. 1910. Based on *A. violaceum* var. *andinum* Scribn. and Smith.

(13) **Agropyron trachycaulum** (Link) Malte, Canada Natl. Mus. Ann. Rpt. 1930. (Bul. 68): 42. 1932. Based on *Triticum trachycaulum* Link.

Triticum pauciflorum Schwein., in Keat., Narr. Exped. St. Peter's River 2: 383. 1824. Prairies of the St. Peter [Minn.], Say in 1823. Not *A. pauciflorum* Schur, 1859.

?*Triticum missuricum* Spreng., Syst. Veg. 1: 325. 1825. Missouri River. *Festuca spicata* Pursh erroneously cited as synonym. The type has not been found. A specimen of *Agropyron trachycaulum* in the Vienna Herbarium, collected by Geyer, "Missouri" in 1839 (long after the name was published), is labeled *T. missuricum* Spreng. There are no rhizomes. Sprengel's description is inadequate, but applies to *A. trachycaulum*. *Triticum repens* and other species having rhizomes are described as having "radice repente," while *T. missuricum* is not so described.

- Triticum trachycaulum* Link, Hort. Berol. 2: 189. 1833. Grown from seed collected by Richardson in North America.
- Agropyron trachycaulon* Steud., Syn. Pl. Glum. 1: 344. 1854. Garden name as synonym of *Triticum trachycaulum* Link.
- Crithopyrum trachycaulon* Steud., Syn. Pl. Glum. 1: 344. 1854. Garden name, as synonym of *Triticum trachycaulum* Link.
- Agropyron tenerum* Vasey, Bot. Gaz. 10: 258. 1885. Rocky Mountains. [Type, Fort Garland, Colo., Vasey in 1884.]
- Agropyron violaceum* var. *majus* Vasey, U. S. Natl. Herb. Contrib. 1: 280. 1893. Oregon, Cusick 1134.
- Agropyron repens* var. *tenerum* Beal, Grasses N. Amer. 2: 637. 1896. Based on *A. tenerum* Vasey.
- Agropyron tenerum* var. *longifolium* Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 30. 1897. Oregon, Giant's [error for Grant's] Pass, Howell 256.
- Agropyron tenerum* var. *ciliatum* Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 30. 1897. Minnesota [type, Duluth, Vasey in 1881] to Nebraska and Utah.
- Agropyron novae-angliae* Scribn. in Brain., Jones, and Eggl., Fl. Vt. 103. 1900. Westmore, Vt., Grout and Eggleston in 1894.
- Agropyron tenerum majus* Piper, Torrey Bot. Club Bul. 32: 543. 1905. Based on *A. violaceum* var. *major* Vasey.
- Agropyron tenerum trichocoleum* Piper, Torrey Bot. Club Bul. 32: 546. 1905. Based on *A. tenerum* var. *ciliatum* Scribn. and Smith.
- Agropyron caninum* var. *tenerum* Pease and Moore, Rhodora 12: 71. 1910. Based on *A. tenerum* Vasey.
- Agropyron caninum* var. *tenerum* forma *ciliatum* Pease and Moore, Rhodora 12: 72. 1910. Based on *A. tenerum* var. *ciliatum* Scribn. and Smith.
- Agropyron caninum* var. *tenerum* forma *fernaldii* Pease and Moore, Rhodora 12: 73. 1910. Quebec, Macoun Herb. Geol. Survey Canada 68978.
- Agropyron caninum* var. *hornemanni* forma *pilosifolium* Pease and Moore, Rhodora 12: 75. 1910. Dead River, Maine, Fernald 576.
- Zeia tenera* Lunell, Amer. Midl. Nat. 4: 227. 1915. Based on *Agropyron tenerum* Vasey.
- Agropyron tenerum* var. *novae-angliae* Farwell, Mich. Acad. Sci. Rpt. 21: 355. 1920. Based on *A. novae-angliae* Scribn.
- Agropyron missuricum* Farwell, Amer. Midl. Natl. 12: 48. 1930. Based on *Triticum missuricum* Spreng.
- Agropyron trachycaulum* var. *tenerum* Malte, Canada Natl. Mus. Ann. Rpt. 1930 (Bul. 68): 44. 1932. Based on *A. tenerum* Vasey.
- Agropyron trachycaulum* var. *glaucescens* Malte, Canada Natl. Mus. Ann. Rpt. 1930 (Bul. 68): 45. 1932. Saskatchewan, Malte.
- Agropyron trachycaulum* var. *trichocoleum* Malte, Canada Natl. Mus. Ann. Rpt. 1930 (Bul. 68): 45. 1932. Based on *A. tenerum trichocoleum* Piper.
- Agropyron trachycaulum* var. *fernaldii* Malte, Canada Natl. Mus. Ann. Rpt. 1930 (Bul. 68): 46. 1932. Based on *A. caninum* var. *tenerum* forma *fernaldii* Pease and Moore.
- Agropyron trachycaulum* var. *majus* Fernald, Rhodora 35: 171. 1933. Based on *A. violaceum* var. *major* Vasey.
- Agropyron trachycaulum* var. *novae-angliae* Fernald, Rhodora 35: 174. 1933. Based on *A. novae-angliae* Scribn.
- Agropyron pauciflorum* Hitchc., Amer. Jour. Bot. 21: 132. 1934. Based on *Triticum pauciflorum* Schwein. Not *A. pauciflorum* Schur., 1859.
- Roegneria trachycaulon* Nevski in Komarov, Fl. U. R. S. S. 2: 599. 1934. Based on *Triticum trachycaulum* Link.
- Roegneria pauciflora* Hylander, Uppsala Univ. Årssk. 7: 36, 89. 1945. Based on *Triticum pauciflorum* Schwein.
- Elymus pauciflorus* Gould, Madroño 9: 126. 1947. Based on *Triticum pauciflorum* Schwein. Not *Elymus pauciflorus* Lam., 1791.
- Alpine forms of this species have been referred to *Agropyron violaceum* (Hornem.) Lange and to *A. biflorum* (Brign.) Roem. and Schult.
- Agropyron trichophorum*** (Link) Richt., Pl. Eur. 1: 124. 1890. Based on *Triticum trichophorum* Link.
- Triticum trichophorum* Link, Linnaea 17: 395. 1843. Europe.
- Elytrigia trichophora* Nevski, Acta Univ. Asiae Med. VIII b, Bot. 17: 57. 1934. Based on *Triticum trichophorum* Link.
- Agropyron triticeum*** Gaertn., Nov. Comm. Petrop. 14¹: 540. 1770. Russia.
- Secale prostratum* Pall., Reise Prov. Russ. Reich. Anhang 1: 485. 1771. Russia.
- Triticum prostratum* L. f., Sup. Pl. 114. 1781. Based on *Secale prostratum* Pall.
- Agropyron prostratum* Beauv., Ess. Agrost. 102, 146. 1812. Based on *Triticum prostratum* L. f.
- (11) ***Agropyron vulpinum*** (Rydb.) Hitchc., Amer. Jour. Bot. 21: 132. 1934. Based on *Elymus vulpinus* Rydb.
- Elymus vulpinus* Rydb., Torrey Bot. Club Bul. 36: 540. 1909. Grant County, Nebr., Rydberg 1617.
- Agropyron richardsoni vulpinus* Hitchc., Wash. Biol. Soc. Proc. 41: 159. 1928. Based on *Elymus vulpinus* Rydb.

(71) AGROSTIS L.

- (3) *Agrostis aequivalvis* (Trin.) Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4: 362. 1841. Based on *A. canina* var. *aequalvis* Trin.
- Agrostis canina* var. *aequalvis* Trin. in Bong., Acad. St. Pétersb. Mém. VI. Math. Phys. Nat. 2: 171. 1832. Sitka, Alaska.
- Deyeuxia aequivalvis* Benth. ex Vasey, U. S. Natl. Herb. Contrib. 3: 77. 1892, as synonym of *Agrostis aequivalvis* Trin. ex Jacks., Ind. Kew. 1: 740. 1893. Based on *A. aequivalvis* Trin. (as indicated by the reference to Benth., Linn. Soc. Bot. Jour. 19: 91. 1881, the combination not there made).
- Podagrostis aequivalvis* Scribn. and Merr., U. S. Natl. Herb. Contrib. 13: 58. 1910. Based on *Agrostis canina* var. *aequalvis* Trin.
- (8) *Agrostis alba* L., Sp. Pl. 63. 1753; ed. 2. 1: 93. 1762. Europe. Linnaeus' diagnosis is inadequate and his original application of the name is uncertain, but the specimen in his herbarium bearing the name in his own script belongs to the species for which the name has been generally used by European and American authors ever since. In recent American works this species has been called *A. palustris* Huds. But this name proves to belong to the creeping species with contracted panicle, the same as *A. maritima* Lam. See U. S. Dept. Agr., Bur. Plant Indus. Bul. 68: 25. 1905, and U. S. Dept. Agr. Bul. 772: 128. 1920, for discussion of *A. alba* L. In the second edition of the Species Plantarum an undoubted reference to this species is added to the original uncertain one. *Agrostis gigantea* Roth, Tent. Germ. 1: 31. 1788, described from Germany, is this species according to W. R. Philipson, who examined the type specimen borrowed from Berlin. (See Philipson, Revision of British species of *Agrostis* L., Linn. Soc. Jour. Bot. 51: 90. 1937.)
- Agrostis dispar* Michx., Fl. Bor. Amer. 1: 52. 1803. South Carolina.
- Decandolia alba* Bast., Fl. Maine-et-Loire 29. 1809. Based on *Agrostis alba* L.
- Vilfa alba* Beauv., Ess. Agrost. 16, 146, 181. 1812. Based on *Agrostis alba* L.
- Vilfa dispar* Beauv., Ess. Agrost. 16, 147, 181. 1812. Based on *Agrostis dispar* Michx.
- Agrostis alba* var. *major* Gaudin, Fl. Helv. 1: 189. 1828. Switzerland.
- Agrostis alba* var. *dispar* Wood, Class-book ed. 1861. 774. 1861. Based on *A. dispar* Michx.
- Agrostis alba* Lunell, Amer. Midl. Nat. 4: 216. 1915. Based on *Agrostis alba* L.
- Agrostis stolonifera* var. *major* Farwell, Mich. Acad. Sci. Rpt. 21: 351. 1920. Based on *A. alba* var. *major* Gaudin.
- Agrostis stolonifera* forma *aristigera* Fernald, Rhodora 35: 317. 1933. Granville, Mass., *Seymour*.
- Agrostis gigantea* var. *dispar* Philipson, Linn. Soc. Jour. Bot. 51: 93. pl. 10. 1937. Based on *A. dispar* Michx.
- Agrostis alba* L. forma *aristata* Fernald, Rhodora 49: 112. 1947. Based on "*A. stolonifera* forma *aristata* Fernald."
- Agrostis alba* forma *aristigera* Fernald, Rhodora 51: 192. 1949. Based on *A. stolonifera* forma *aristigera* Fernald.
- (33) *Agrostis altissima* (Walt.) Tuckerm., Amer. Jour. Sci. 45: 44. 1843. Based on *Cornucopiae altissima* Walt.
- Cornucopiae altissima* Walt., Fl. Carol. 74. 1788. South Carolina.
- Trichodium elatum* Pursh, Fl. Amer. Sept. 1: 61. 1814. New Jersey, Carolina.
- Agrostis elata* Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4: 317. 1841. Based on *Trichodium elatum* Pursh.
- Trichodium altissimum* Michx. ex Wood, Class-book ed. 2. 599. 1847. Based on *Cornucopiae altissima* Walt.
- Agrostis perennans* var. *elata* Hitchc., U. S. Dept. Agr., Bur. Plant Indus. Bul. 68: 50. 1905. Based on *Trichodium elatum* Pursh. (Published as *A. perennans elata*.)
- Agrostis hymenialis* var. *elata* Fernald, Rhodora 23: 229. 1921. Based on *Trichodium elatum* Pursh.
- (25) *Agrostis ampla* Hitchc., U. S. Dept. Agr., Bur. Plant Indus. Bul. 68: 38. pl. 20. 1905. Rooster Rock, Oreg., *Suksdorf* 135.
- Agrostis exarata* var. *ampla* Hitchc., Amer. Jour. Bot. 2: 303. 1915. Based on *A. ampla* Hitchc.
- (17) *Agrostis aristiglumis* Swallen, West. Bot. Leaflets 5: 56. 1947. Point Reyes Peninsula, Marin County, Calif., *J. T. Howell* 23149.
- (1) *Agrostis avenacea* Gmel., Syst. Nat. 2: 171. 1791. Based on *Avena filiformis* G. Forst.
- Avena filiformis* G. Forst., Fl. Ins. Austr. Prodr. 9. 1786. New Zealand and Easter Island. Not *Agrostis filiformis* Vill., 1787, nor Willd., 1809.
- Agrostis retrofracta* Willd., Enum. Pl. 1: 94. 1809. Australia.
- Vilfa retrofracta* Beauv., Ess. Agrost. 16, 148, 182. 1812. Based on *Agrostis retrofracta* Willd.
- Lachnagrostis retrofracta* Trin., Fund. Agrost. 128. 1820. Based on *Agrostis retrofracta* Willd.
- Lachnagrostis willdenovii* Trin., Gram. Unifl. 217. 1824. Based on *Agrostis retrofracta* Willd.
- Deyeuxia retrofracta* Kunth, Rév. Gram. 1: 77. 1829. Based on *Agrostis retrofracta* Willd.
- Calamagrostis retrofracta* Link, Hort. Berol. 2: 247. 1833. Based on *Agrostis*

- retrofracta* Willd.
Calamagrostis willdenovii Steud., Syn. Pl. Glum. 1: 192. 1854. Based on *Lachnagrostis willdenovii* Trin.
- (22) *Agrostis blasdalei* Hitchc., Wash. Biol. Soc. Proc. 41: 160. 1928. Fort Bragg, Calif., *Davy* and *Blasdale* 6159.
- (36) *Agrostis borealis* Hartm., Handb. Skand. Fl. ed. 3. 17. 1838. Lapland. ?*Agrostis rubra* L., Sp. Pl. 62. 1753. Sweden. Identity uncertain.
- Agrostis canina* var. *alpina* Oakes, Cat. Vt. Pl. 32. 1842. Name only. Camels Hump Mountain, Vt., *Roëbins*, *Tuckerman*, and *Macrae*.
- Agrostis canina* var. *tenella* Torr., Fl. N. Y. 2: 443. 1843. Northern New York.
- Agrostis pickeringii* Tuckerm., Mag. Hort. Hovey 9: 143. 1843. White Mountains, N. H.
- Agrostis concinna* Tuckerm., Mag. Hort. Hovey 9: 143. 1843. Mount Monroe, White Mountains, N. H.
- Agrostis pickeringii* var. *rupicola* Tuckerm., Amer. Jour. Sci. 45: 42. 1843. White Mountains, N. H., *Pickering* and *Oakes*; Vermont, Camels Hump.
- Trichodium concinnum* Wood, Class-book ed. 2. 600. 1847. Based on *Agrostis concinna* Tuckerm.
- Agrostis rubra* var. *americana* Scribn. in Macoun, Can. Pl. Cat. 25: 391. 1890. Based on "*A. rupestris* Chapm. (non All.), found on Roan Mountain, North Carolina"; Tenn. Agr. Expt. Sta. Bul. 7: 77. f. 100. 1894. (See below.)
- Agrostis novae-angliae* Vasey, U. S. Natl. Herb. Contrib. 3: 76. 1892. Not *A. novae-angliae* Tuckerm. [Mount Washington, N. H., *Pringle*.]
- Agrostis rubra* var. *alpina* MacM., Met. Minn. Vall. 65. 1892. Based on *A. canina* var. *alpina* Oakes.
- Agrostis borealis* var. *macrantha* Eames, Rhodora 11: 88. 1909. Blow-me-down Mountains, Nova Scotia, *Eames* and *Godfrey* in 1908 [No. 5833, the spikelets abnormal].
- Agrostis bakeri* Rydb., Torrey Bot. Club Bul. 36: 532. 1909. Pagosa Peak, Colo., *Baker* 150.
- Agrostis borealis* var. *typica* Fernald, Rhodora 35: 204. 1933. Based on *A. borealis* Hartm.
- Agrostis borealis* var. *americana* Fernald, Rhodora 35: 205. 1933. Based on *A. rubra* var. *americana* Scribn.
- Agrostis borealis* forma *macrantha* Fernald, Rhodora 35: 205. 1933. Based on *A. borealis* var. *macrantha* Eames.
- This species was erroneously referred to *Agrostis rupestris* All. by A. Gray in a list of plants from Roan Mountain, N. C., and by Chapman (Fl. South. U. S. 551. 1860).
- (26) *Agrostis californica* Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 359. 1841. California. (*Vilfa glomerata* Presl erroneously cited as synonym.)
- Agrostis densiflora* Vasey, U. S. Natl. Herb. Contrib. 3: 72. 1892. Santa Cruz, Calif., *Anderson*.
- Agrostis densiflora* var. *arenaria* Vasey, U. S. Natl. Herb. Contrib. 3: 72. 1892. Mendocino County, Calif., *Pringle*.
- Agrostis arenaria* Scribn., U. S. Natl. Herb. Contrib. 3: 72. 1892. Not *A. arenaria* Gouan, 1773. As synonym of *A. densiflora* var. *arenaria* Vasey.
- (35) *Agrostis canina* L., Sp. Pl. 62. 1753. Europe.
- Trichodium caninum* Schrad., Fl. Germ. 1: 198. 1806. Based on *Agrostis canina* L.
- Agraulus caninus* Beauv., Ess. Agrost. 5, 146, 147. 1812. Based on *Agrostis canina* L.
- Agrostis canina* var. *alpina* Wood, Amer. Bot. and Flor. pt. 2: 384. 1871. Not *A. canina* var. *alpina* Ducomm., 1869. Mountains of the Eastern States.
- Agrostis alba* var. *vulgaris* forma *aristata* Millsp., Fl. W. Va. 469. 1892. Monangalia, W. Va.
- Agrostis canina* Bubani, Fl. Pyr. 4: 286. 1901. Based on *Agrostis canina* L.
- (21) *Agrostis diegoensis* Vasey, Torrey Bot. Club Bul. 13: 55. 1886. San Diego, Calif., *Orcutt*.
- Agrostis foliosa* Vasey, Torrey Bot. Club Bul. 13: 55. 1886. Not *A. foliosa* Roem. and Schult., 1817. Oregon, *Howell* [type] and *Bolander*.
- Agrostis diegoensis* var. *foliosa* Vasey, U. S. Natl. Herb. Contrib. 3: 74. 1892. Based on *A. foliosa* Vasey.
- Agrostis canina* var. *stolonifera* Vasey, U. S. Natl. Herb. Contrib. 3: 75. 1892. Not *A. canina* var. *stolonifera* Blytt, 1847. Oregon, *Henderson* [type] and *Howell*.
- Agrostis multiculmis* Vasey ex Beal, Grasses N. Amer. 2: 328. 1896, as synonym of *A. diegoensis* Vasey.
- Agrostis pallens foliosa* Hitchc., U. S. Dept. Agr., Bur. Plant Indus. Bul. 68: 34, pl. 14, f. 1. 1905. Based on *A. foliosa* Vasey.
- Agrostis pallens* var. *vaseyi* St. John, Fl. Southeast. Wash. and Adj. Idaho 30. 1937. Based on *A. foliosa* Vasey, not *A. foliosa* Roem. and Schult.
- (12) *Agrostis elliottiana* Schult., Mantissa 2: 202. 1824. Based on *A. arachnoides* Ell.
- Agrostis arachnoides* Ell., Bot. S. C. and Ga. 1: 134. 1816. Not *A. arachnoides* Poir., 1810. Orangeburg, S. C., *Bennett*.
- Notonema arachnoides* Raf. ex Jacks., Ind. Kew. 2: 319. 1894, as synonym of *Agrostis arachnoides* Ell.
- Notonema agrostoides* Raf. ex Merrill, Ind. Rafin. 76. 1949. Error for *N. arachnoides* Raf.

- (24) *Agrostis exarata* Trin., Gram. Unifl. 207. 1824. Unalaska, *Eschscholtz*.
Agrostis exarata var. *minor* Hook., Fl. Bor. Amer. 2: 239. 1839. Rocky Mountains, *Drummond*, *Douglas*.
Agrostis grandis Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 316. 1841. "Columbia (*Hooker*)."
Agrostis asperifolia Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 317. 1841. "Amer. bor.? Chile? (*Hooker*)."
 Probably collected in the Rocky Mountains and received from *Hooker*.
Agrostis scouleri Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 329. 1841. Nootka Sound, Vancouver Island, [received from] *Hooker*.
Agrostis albicans Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 91. 1862. Columbia woods, Oreg., *Nuttall*.
Agrostis oregonensis Nutt. ex A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 334. 1862, as synonym of *A. albicans* Buckl.
Agrostis exarata forma *asperifolia* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 13¹: pl. 31. 1892. No reference to *Trinius*, but the original of plate 31 is labeled *A. asperifolia* Trin. in Vasey's script.
Agrostis exarata var. *purpurascens* Hultén, Fl. Aleut. Isl. 73. 1937. Aleutian Islands, Unalaska, *Eyerdam* 2285.
- AGROSTIS EXARATA VAR. PACIFICA Vasey, U. S. Dept. Agr., Div. Bot. Spec. Bul. (new ed.) 1889: 107. pl. 106. 1889. Pacific Coast.
- AGROSTIS EXARATA VAR. MONOLEPIS (Torr.) Hitchc., Amer. Jour. Bot. 21: 136. 1934. Based on *Polypogon monspeliensis* var. *monolepis* Torr.
Polypogon monspeliensis var. *monolepis* Torr., U. S. Expl. Miss. Pacif. Rpt. 5: 366. 1858. Posé Creek, Walkers Pass, Calif. [Blake].
Agrostis ampla forma *monolepis* Beetle, Torrey Bot. Club Bul. 72: 544. 1945. Based on *Polypogon monspeliensis* var. *monolepis* Torr.
- (13) *Agrostis exigua* Thurber, in S. Wats., Bot. Calif. 2: 275. 1880. Foothills of Sierras, Calif., *Bolander*.
- (18) *Agrostis hallii* Vasey, U. S. Natl. Herb. Contrib. 3: 74. 1892. Oregon [type, *Hall* in 1872], Washington, and California.
Agrostis davyi Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 30: 3. 1901. Point Arena, Calif., *Davy* and *Blasdale* 6062.
Agrostis occidentalis Scribn. and Merr., Torrey Bot. Club Bul. 29: 466. 1902. McMinnville, Oreg., *Shear* 1644.
- AGROSTIS HALLII VAR. PRINGLEI (Scribn.) Hitchc., U. S. Dept. Agr., Bur. Plant Indus. Bul. 68: 33. pl. 12. 1905. Based on *A. pringlei* Scribn. (Published as *A. hallii pringlei*).
Agrostis pringlei Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 7: 156. f. 138. 1897. Mendocino County, Calif., *Pringle*.
- (14) *Agrostis hendersonii* Hitchc., Wash. Acad. Sci. Jour. 20: 381. 1930. Sams Valley, near Gold Hill, Jackson County, Oreg., *Henderson* 12387.
Agrostis microphylla var. *hendersonii* Beetle, Torrey Bot. Club Bul. 72: 547. f. 8. 1945. Based on *A. hendersonii* Hitchc.
- (29) *Agrostis hiemalis* (Walt.) B. S. P., Prel. Cat. N. Y. 68. 1888. Based on *Cornucopiae hyemalis* Walt.
Cornucopiae hyemalis Walt., Fl. Carol. 73. 1788. South Carolina.
Trichodium laxiflorum Muhl., Descr. Gram. 60. 1817. Not *T. laxiflorum* Michx., 1803. Pennsylvania.
Agrostis laxiflora Poir. in Lam., Encycl. Sup. 1: 255. 1810. Carolina, *Bosc*.
Trichodium laxum Schult., Mantissa 2: 157. 1824. Based on *T. laxiflorum* Muhl.
Agrostis leptos Steud., Syn. Pl. Glum. 1: 169. 1854. Louisiana.
Agrostis canina var. *hyemalis* Kuntze, Rev. Gen. Pl. 3²: 338. 1898. Based on *Cornucopiae hyemalis* Walt.
Agrostis antecedens Bicknell, Torrey Bot. Club Bul. 35: 473. 1908. Nantucket, Bicknell in 1908.
Agrostis hyemalis Lunell, Amer. Midl. Nat. 4: 216. 1915. Based on *Cornucopiae hyemalis* Walt.
- (27) *Agrostis hooveri* Swallen, West. Bot. Leaflets 5: 198. 1949. Type collected in sandy soil in open oak woodland, at summit on road between Arroyo Grande and Huasna district, San Luis Obispo County, Calif., June 29, 1948, by *Robert F. Hoover* 7549.
- (28) *Agrostis howellii* Scribn., U. S. Natl. Herb. Contrib. 3: 76. 1892. Hood River, Oreg., *Howell* 198.
- (10) *Agrostis humilis* Vasey, Torrey Bot. Club Bul. 10: 21. 1883. Mount Paddo [Adams], Wash., *Howell* [85].
- (31) *Agrostis idahoensis* Nash, Torrey Bot. Club Bul. 24: 42. 1897. Forest, Idaho, *Heller* 3431.
Agrostis tenuis Vasey, Torrey Bot. Club Bul. 10: 21. 1883. Not *A. tenuis* Sibth. 1794. San Bernardino Mountains, Calif., *Parish Bros.* [1085].
Agrostis tenuiculmis Nash in Rydb., N. Y. Bot. Gard. Mem. 1: 32. 1900. Based on *A. tenuis* Vasey.
Agrostis tenuiculmis recta Nash in Rydb., N. Y. Bot. Gard. Mem. 1: 32. 1900. [Belt Pass, Mont., *Rydberg* 3327½.]
Agrostis tenuis erecta Vasey ex Nash in Rydb., N. Y. Bot. Gard. Mem. 1: 32. 1900, as synonym of *A. tenuiculmis recta* Nash.
Agrostis filiculmis Jones, West. Bot. Contrib. 14: 13. 1912. Little De Motte Park on the Kaibab, northern Arizona, [*Jones* 6056 bb.]

- (15) *Agrostis kennedyana* Beetle, Torrey Bot. Club Bul. 72: 547. 1945. California, San Diego, *Grant* 896.
- (19) *Agrostis lepida* Hitchc. in Jepson, Fl. Calif. 1: 121. 1912. Siberian Pass, Sequoia National Park, Calif., *Hitchcock* 3455.
- (37) *Agrostis longiligula* Hitchc., U.S. Dept. Agr., Bur. Plant Indus. Bul. 68: 54. 1905. Fort Bragg, Calif., *Davy* and *Blasdale* 6110.
- AGROSTIS LONGILIGULA var. AUSTRALIS J. T. Howell, West. Bot. Leaflets 4: 246. 1946. Marin County, Calif., *J. T. Howell* 18250.
- (16) *Agrostis microphylla* Steud., Syn. Pl. Glum. 1: 164. 1854. North America, *Douglas*.
- Agraulus brevifolius* Nees ex Torr., U. S. Expl. Miss. Pacif. Rpt. 4: 154. 1857, as synonym of *Agrostis microphylla* Steud.
- Polypogon alopecuroides* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 88. 1862. Columbia Plains, Oreg., *Nuttall*.
- Agrostis alopecuroides* A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 333. 1862. Not *A. alopecuroides* Lam., 1791. Based on *Polypogon alopecuroides* Buckl.
- Deyeuxia alopecuroides* Nutt. ex A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 333. 1862, as synonym of *Polypogon alopecuroides* Buckl.
- Agrostis exarata* var. *microphylla* S. Wats. ex Vasey, U.S. Natl. Herb. Contrib. 3: 72. 1892, as synonym of *A. microphylla* var. *major* Vasey.
- Agrostis virescens microphylla* Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 30: 2. 1901. Based on *A. microphylla* Steud.
- Agrostis microphylla* var. *intermedia* Beetle, Torrey Bot. Club Bul. 72: 547. f. 7. 1945. Lake County, Calif., *J. T. Howell* 18063.
- AGROSTIS MICROPHYLLA var. MAJOR Vasey, U.S. Natl. Herb. Contrib. 3: 58, 72. 1892. [Truckee Valley, Nev., *Watson* 1284.]
- Agrostis exarata microphylla* Hitchc., Amer. Jour. Bot. 2: 303. 1915. Based on *A. microphylla* Steud.
- Agrostis nebulosa* Boiss. and Reut., Bibl. Univ. Genève (n.s.) 38: 218. 1842. Spain.
- (7) *Agrostis nigra* With., Bot. Arr. Veg. Brit. ed. 3. 2: 131. 1796. Europe.
- (34) *Agrostis oregonensis* Vasey, Torrey Bot. Club Bul. 13: 55. 1886. Oregon, *Howell* [49].
- Agrostis attenuata* Vasey, Bot. Gaz. 11: 337. 1886. Mount Hood, Oreg., *Howell* [210].
- Agrostis hallii* var. *californica* Vasey, U. S. Natl. Herb. Contrib. 3: 74. 1892. California [*Bolander* 6103].
- Agrostis schiedeana* var. *armata* Suksdorf, Werdenda 1²: 1. 1923. Klickitat County, Wash., *Suksdorf* 6310.
- (20) *Agrostis pallens* Trin., Acad. St. Pétersb. Mem. VI. Sci. Nat. 4¹: 328. 1841. "Amer.-borealis? (*Hooker*)."
- Agrostis exarata* var. *littoralis* Vasey, Torrey Bot. Club Bul. 13: 54. 1886. Oregon, *Howell* [64].
- Agrostis densiflora* var. *littoralis* Vasey, U. S. Natl. Herb. Contrib. 3: 72. 1892. Based on *A. exarata* var. *littoralis* Vasey.
- (6) *Agrostis palustris* Huds., Fl. Angl. 27. 1762. England.
- Agrostis polymorpha* var. *palustris* Huds., Fl. Angl. 32. 1778. Based on *A. palustris* Huds.
- Agrostis maritima* Lam., Encycl. 1: 61. 1783. France.
- Agrostis alba* var. *palustris* Pers., Syn. Pl. 1: 76. 1805. Based on *A. palustris* Huds.
- Milium maritimum* Clem. y Rubio, Ensay. Vid. Andaluc. 285. 1807. Based on *Agrostis maritima* Lam.
- Agrostis decumbens* Gaud. ex Muhl., Descr. Gram. 68. 1817. Not *A. decumbens* Host, 1809. Pennsylvania, New Jersey.
- Vilfa stolonifera* var. *maritima* S. F. Gray, Nat. Arr. Brit. Pl. 2: 146. 1821. Based on *Agrostis maritima* With. (error for Lam.).
- Apera palustris* S. F. Gray, Nat. Arr. Brit. Pl. 2: 148. 1821. Based on *Agrostis palustris* With. (error for Huds.).
- Agrostis alba* var. *maritima* G. Meyer, Hannov. Mag. 1823: 138. 1824. Based on *A. maritima* Lam.
- Agrostis stolonifera* var. *maritima* Koch, Syn. Fl. Germ. Helv. 781. 1837. Based on *A. maritima* Lam.
- ? *Agrostis alba* var. *decumbens* Eaton and Wright, N. Amer. Bot. ed. 8. 117. 1840. Not *A. alba* var. *decumbens* Gaudin, 1828. Eastern United States.
- Agrostis stolonifera* var. *compacta* Hartm., Skand. Flora Handb. ed. 4. 24. 1843. Scandinavia.
- Agrostis alba* forma *maritima* Parl., Fl. Ital. 1: 181. 1848. Based on *A. maritima* Lam.
- Agrostis depressa* Vasey, Torrey Bot. Club Bul. 13: 54. 1886. Clear Creek Canyon, Colo., *Patterson* in 1885.
- Agrostis exarata* var. *stolonifera* Vasey, Torrey Bot. Club Bul. 13: 54. 1886. Columbia River, *Suksdorf*.
- Agrostis reptans* Rydb., Fl. Rocky Mount. 54. 1917. Based on *A. exarata* var. *stolonifera* Vasey.
- Agrostis stolonifera* var. *palustris* Farwell, Mich. Acad. Sci. Rpt. 21: 351. 1920. Based on *A. polymorpha* var. *palustris* Huds.

New England specimens of this species have been referred to *A. alba* var. *coarctata* Scribn., based on *A. coarctata* Ehrh., of Germany, which appears to be a narrow-panicked form of *A. stolonifera* L.

(32) *Agrostis perennans* (Walt.) Tuckerm., Amer. Jour. Sci. 45: 44. 1843. Based on *Cornucopiae perennans* Walt.

Cornucopiae perennans Walt., Fl. Carol. 74. 1788. South Carolina.

Agrostis cornucopiae Smith, Gentleman's Mag. 59: 873. 1789. Based on *Cornucopiae perennans* Walt.

Agrostis elegans Salisb., Prodr. Stirp. 25. 1796. Based on *Cornucopiae perennans* Walt.

Agrostis anomala Willd., Sp. Pl. 1: 370. 1797. Based on *Cornucopiae perennans* Walt.

Alopecurus carolinianus Spreng., Nachtr. Bot. Gart. Halle 10. 1801. Not *A. carolinianus* Walt., 1788. [Kentucky, Peter.]

Trichodium decumbens Michx., Fl. Bor. Amer. 1: 42. 1803. Virginia to Florida, Michaux.

Trichodium perennans Ell., Bot. S. C. and Ga. 1: 99. 1816. Based on *Cornucopiae perennans* Walt.

Trichodium muhlenbergianum Schult., Mantissa 2: 159. 1824. Pennsylvania, Muhlenberg. Based on Muhlenberg's *Trichodium* No. 4.

Agrostis michauxii Trin., Gram. Unif. 206. 1824. Not *A. michauxii* Zucc., 1809. Based on *Trichodium decumbens* Michx.

Agrostis noveboracensis Spreng., Syst. Veg. 1: 260. 1825. New York, Torrey.

Agrostis decumbens Link, Hort. Berol. 1: 80. 1827. Not *A. decumbens* Host, 1809. Based on *Trichodium decumbens* Michx.

Trichodium noveboracense Schult., Mantissa 3 (Add. 1): 555. 1827. Based on *Agrostis noveboracensis* Spreng.

Trichodium scabrum [Muhl., misapplied by] Darl., Fl. Cestr. 1: 54. 1837. Pennsylvania.

Agrostis schweinitzii Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 311. 1841. Pennsylvania, Schweinitz.

Agrostis oreophila Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 323. 1841. Bethlehem, Pa., Moser. (*Trichodium montanum* Torr. is erroneously cited as synonym.)

Agrostis abakanensis Less. ex Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 325. 1841, as synonym of *A. michauxii* Trin.

Agrostis schiedeana Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 327. 1841. Mexico, type received from Schrader.

Agrostis novae-angliae Tuckerm., Mag. Hort. Hovey 9: 143. 1843. White Mountains, N. H.

Agrostis campyla Tuckerm., Amer. Jour. Sci. II. 6: 231. 1848. Based on "*A. scabra*" as described by Tuckerman.

Agrostis scabra var. *perennans* Wood, Class-book ed. 1861. 774. 1861. Presumably based on *A. perennans* Tuckerm.

Agrostis perennans var. *aestivalis* Vasey, U.S. Natl. Herb. Contrib. 3: 76. 1892. Athens, Ill. [Hall]. The slender lax form.

Agrostis intermedia Scribn., Torrey Bot. Club Bul. 20: 476. 1893. Not *A. intermedia* Balb., 1801. Pine Mountain, Harlan County, Tenn. Kearney 39.

Agrostis pseudointermedia Farwell, Detroit Commr. Parks and Boul. Ann. Rpt. 11: 46. 1900. Based on *A. intermedia* Scribn.

Agrostis scribneriana Nash in Small, Fl. Southeast. U. S. 126. 1903. Based on *A. intermedia* Scribn.

Agrostis hyemalis var. *oreophila* Farwell, Mich. Acad. Sci. Rpt. 6: 202. 1904. Based on *A. oreophila* Trin.

Agrostis perennans var. *humilis* Farwell, Mich. Acad. Sci. Papers 1: 87. 1921. Detroit, Farwell 5672½.

Agrostis perennans forma *chaetophora* Fernald, Rhodora 35: 317. 1933. Huntingdon County, Pa., Lowrie.

Agrostis perennans var. *aestivalis* forma *atherophora* Fernald, Rhodora 35: 317. 1933. Terrebonne, Quebec, Churchill.

(11) *Agrostis rossae* Vasey, U. S. Natl. Herb. Contrib. 3: 76. 1892. Yellowstone Park, Wyo., Edith Ross in 1890.

Agrostis exarata var. *rossae* G. N. Jones, Wash. Univ. Pubs. Biol. 5: 113. 1936. Based on *A. rossae* Vasey.

(30) *Agrostis scabra* Willd., Sp. Pl. 1: 370. 1797. North America.

Agrostis laxa Muhl., Amer. Phil. Soc. Trans. 4: 236. 1799. Name only.

Trichodium laxiflorum Michx., Fl. Bor. Amer. 1: 42. 1803. Hudson Bay to Florida, Michaux.

Vilfa scabra Beauv., Ess. Agrost. 16, 182. 1812. Based on *Agrostis scabra* Willd.

Trichodium scabrum Muhl., Cat. Pl. 10. 1813. Based on *Agrostis scabra* Willd.

Agrostis laxa Schreb. ex Pursh, Fl. Amer. Sept. 1: 61. 1814, as synonym of *Trichodium laxiflorum* Michx.

Agrostis laxiflora Richards., Bot. App. Franklin Jour. 731. 1823. Based on *Trichodium laxiflorum* Michx.

Trichodium montanum Torr., Fl. North. and Mid. U. S. 84. 1823. Fishkill Mountains, N. Y.

Trichodium album Presl, Rel. Haenk. 1: 244. 1830. Nootka Sound, Vancouver Island, Haenke.

Agrostis nutkaensis Kunth, Rév. Gram. 1: Sup. 17. 1830. Based on *Trichodium album* Presl.

Agrostis michauxii var. *laxiflora* A. Gray,

- N. Amer. Gram. and Cyp. 1: 17. 1834. Based on *Trichodium laxiflorum* Michx.
- Agrostis nootkaensis* Trin., Acad. Sci. Pétersb. Mém. VI. Sci. Nat. 4: 326. 1841. Based on *Trichodium album* Presl.
- Agrostis laxiflora* var. *montana* Tuckerm., Amer. Jour. Sci. 45: 43. 1843. Based on *Trichodium montanum* Torr.
- Agrostis scabra* var. *tenuis* Tuckerm., Amer. Jour. Sci. 45: 45. 1843. Lincoln, N. H.
- Agrostis laxiflora* var. *caespitosa* Torr., Fl. N. Y. 2: 442. 1843. Based on *Trichodium montanum* Torr.
- Agrostis laxiflora* var. *scabra* Torr., Fl. N. Y. 2: 442. 1843. Based on *A. scabra* Willd.
- Agrostis laxiflora* var. *tenuis* Torr., Fl. N. Y. 2: 442. 1843. Based on *A. scabra* var. *tenuis* Tuckerm.
- Agrostis torreyi* Tuckerm., Mag. Hort. Hovey 9: 143. 1843. Not *A. torreyi* Kunth, 1830. Based on *Trichodium montanum* Torr.
- Agrostis scabra* var. *oreophila* Wood, Class-book ed. 1861. 774. 1861. Based on *A. [laxiflora* var.] *montana* Tuckerm. (There is no reference to *A. oreophila* Trin.)
- Agrostis scabriuscula* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 90. 1862. Columbia Plains, Oreg., Nuttall.
- Agrostis scabrata* Nutt. ex A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 334. 1862, as synonym of *A. scabriuscula* Buckl.
- Agrostis scabra* var. *montana* Fernald, Portland Soc. Nat. Hist. Proc. 2: 91. 1895. Based on *Trichodium montanum* Torr. This combination was made by Paine (giving Tuckerm. as author), State Cabinet Nat. Hist., N. Y. Ann. Rpt. 18: 166. 1865, and by Vasey (also giving Tuckerm. as author), U. S. Natl. Herb. Contrib. 3: 76. 1892, erroneously cited as synonym of *A. novae-angliae* Vasey. The basis is not given in either publication.
- Agrostis hyemalis* var. *keweenawensis* Farwell, Mich. Acad. Sci. Rpt. 6: 203. 1904. Keweenaw County, Mich.
- Agrostis hiemalis nutkaensis* Scribn. and Merr., U. S. Natl. Herb. Contrib. 13: 56. 1910. Based on *A. nutkaensis* Kunth.
- Agrostis scabra* forma *tuckermani* Fernald, Rhodora 35: 207. 1933. Braintree, Mass., Churchill in 1911.
- Agrostis peckii* House, Amer. Midl. Nat. 7: 126. 1921. Based on *A. laxiflora* var. *caespitosa* Torr. "*A. caespitosa* Torr. . . . Not Salisb." is erroneously cited. The statement that "Torrey's type was collected on Mt. Beacon, near Fishkill," indicates that *A. peckii* is based on *A. laxiflora* var. *caespitosa* Torr.
- Agrostis scabra* var. *keweenawensis* Farwell, Mich. Acad. Sci. Papers 23: 125. 1938. Based on *A. hyemalis* var. *keweenawensis* Farwell.
- AGROSTIS SCABRA* var. *GEMINATA* (Trin.) Swallen, Wash. Biol. Soc. Proc. 54: 1941. Based on *Agrostis geminata* Trin.
- Agrostis geminata* Trin., Gram. Unifl. 207. 1824. Unalaska, Eschscholtz.
- Agrostis hyemalis* var. *geminata* Hitchc., U. S. Dept. Agr., Bur. Plant Indus. Bul. 68: 44. 1905. Based on *A. geminata* Trin. (Published as *A. hiemalis geminata*.)
- Agrostis geminata* forma *exaristata* Fernald, Rhodora 35: 211. 1933. Gaspé County, Quebec, Fernald, Dodge, and Smith 25, 485.
- (4) *Agrostis semiverticillata* (Forsk.) C. Christ., Dansk Bot. Arkiv 4³: 12. 1922. Based on *Phalaris semiverticillata* Forsk.
- Phalaris semiverticillata* Forsk., Fl. Aegypt. Arab. 17. 1775. Egypt.
- Agrostis verticillata* Vill., Prosp. Pl. Dauph. 16. 1779. France.
- Agrostis alba* var. *verticillata* Pers., Syn. Pl. 1: 76. 1805. Based on *A. verticillata* Vill.
- Agrostis villarsii* Poir. in Lam., Encycl. Sup. 1: 251. 1810. Based on *A. verticillata* Vill.
- Vilfa verticillata* Beauv., Ess. Agrost. 16, 148, 182. 1812. Based on *Agrostis verticillata* Vill.
- Agrostis decumbens* Muhl. ex Ell. Bot. S. C. and Ga. 1: 136. 1816. Not *A. decumbens* Host, 1809. Charleston, S. C.
- Agrostis stolonifera* var. *verticillata* St. Amans, Fl. Agen. 28. 1821. Based on *A. verticillata* Vill.
- Agrostis condensata* Willd. ex Steud., Nom. Bot. ed. 2. 1: 40. 1840, as synonym of *A. verticillata* Vill.
- Agrostis aquatica* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 90. 1862. Not *A. aquatica* Pourr., 1783. San Saba County, Tex.
- Agrostis verticillata* Bubani, Fl. Pyr. 4: 282. 1901. Based on *Agrostis verticillata* Vill.
- Nowodworskya verticillata* Nevski, Akad. Nauk S. S. S. R. Bot. Inst. Trudy I. (Acad. Sci. U. R. S. S. Inst. Bot. Acta I. Flora et Syst. Plant. Vasc.) 3: 143. 1936. Based on *Agrostis verticillata* Vill.
- Nowodworskya semiverticillata* Nevski, Akad. Nauk S. S. S. R. Bot. Inst. Trudy I. (Acad. Sci. U. R. S. S. Inst. Bot. Acta I. Flora et Syst. Plant. Vasc.) 4: 339. 1937. Based on *Phalaris semiverticillata* Forsk.
- Polypogon semiverticillatus* Hylander, Uppsala Univ. Årsk. 7: 74. 1945. Based on *Phalaris semiverticillata* Forsk. The same combination made by Hoover, West. Bot. Leaflets 5: 138. 1948.
- (5) *Agrostis stolonifera* L., Sp. Pl. 62. 1753. Europe.

- Decandolia stolonifera* Bast., Fl. Maine-et-Loire 29. 1809. Based on *Agrostis stolonifera* L.
- Vilfa stolonifera* Beauv., Ess. Agrost. 16, 148, 182. 1812. Based on *Agrostis stolonifera* L.
- Agrostis alba* var. *stolonifera* Smith, English Fl. 1: 93. 1824. Based on *A. stolonifera* L.
- Agrostis vulgaris* var. *stolonifera* Koch, Syn. Fl. Germ. Helv. 782. 1837. Based on *A. stolonifera* L.
- (9) *Agrostis tenuis* Sibth., Fl. Oxon. 36. 1794. Based on *A. capillaris* Huds.
- Agrostis capillaris* Huds., Fl. Angl. ed. 2. 27. 1762. Not *A. capillaris* L., 1753. England.
- Agrostis sylvatica* Huds., Fl. Angl. ed. 2. 28. 1762. England. A teratological form, the florets abnormally elongated. Name rejected, being based on a monstrosity.
- Agrostis vulgaris* With., Bot. Arr. Veg. Brit. ed. 3. 2: 132. 1796. Europe.
- Vilfa vulgaris* Beauv., Ess. Agrost. 16, pl. 5. f. 8. 1812. Based on *Agrostis vulgaris* With.
- Agrostis alba* var. *sylvatica* Smith, English Fl. 1: 93. 1824. Based on *A. sylvatica* Huds. Published as new by Scribner, Torrey Bot. Club Mem. 5: 40. 1894, the basis given as "*A. sylvatica* L." error for Huds.
- Agrostis alba* var. *vulgaris* Coss. and Dur., Expl. Sci. Alger. 2: 63. 1854-1855. Based on *A. vulgaris* With.
- Agrostis stolonifera* var. *vulgaris* Celak., Prodr. Fl. Bohm. 710. 1881. Not *A. stolonifera* var. *vulgaris* Heuff., 1858. Based on *A. vulgaris* With.
- Agrostis alba* var. *minor* Vasey, U. S. Natl. Herb. Contrib. 3: 78. 1892. [Washington, D.C.]
- Agrostis stolonifera* var. *minor* Farwell, Mich. Acad. Sci. Rpt. 6: 202. 1904. Based on *A. alba* var. *minor* Vasey.
- This species has been referred to *Agrostis capillaris* L., a European species not known from America.
- AGROSTIS TENUIS var. ARISTATA (Parnell) Druce, List Brit. Pl. 79. 1908. Presumably based on *A. vulgaris* var. *aristata* Parnell.
- Agrostis stricta* Willd., Sp. Pl. 1: 366. 1797. Not *A. stricta* Gmel., 1791. North America.
- Agrostis stricta* Muhl., Descr. Gram. 65. 1817. Not *A. stricta* Gmel., 1791. New England and Carolina.
- Trichodium strictum* Roem. and Schult., Syst. Veg. 2: 281. 1817. Based on *Agrostis stricta* Willd.
- Agrostis diffusa* Muhl. ex Spreng., Syst. Veg. 1: 260. 1825. Not *A. diffusa* Host, 1809, nor Muhl., 1817. As synonym of *A. stricta* Muhl.
- Agrostis vulgaris* var. *aristata* Parnell, Grasses Scotl. 1: 34. pl. 13. 1842. Scotland.
- Agrostis alba* var. *aristata* A. Gray, Man. 578. 1848. Not *A. alba* var. *aristata* Spenner, 1825. Based on *A. stricta* Willd.
- Agrostis stricta* Buse, in Miquel, Pl. Jungh. 341. 1854. Not *A. stricta* Gmel., 1791. Based on *Trichodium strictum* Roem. and Schult.
- Agrostis alba* var. *stricta* Wood, Class-book ed. 1861. 774. 1861. Based on *A. stricta* Willd.
- Agrostis tenuis* forma *aristata* Wiegand, Rhodora 26: 2. 1924. Based on *A. vulgaris* var. *aristata* Parnell.
- Agrostis palustris* var. *stricta* House, N. Y. State Mus. Bul. 254: 98. 1924. Based on *Agrostis stricta* Willd.
- Agrostis capillaris* var. *aristata* Druce, Fl. Oxfordsh. ed. 2. 474. 1927. Presumably based on *A. vulgaris* var. *aristata* Parnell.
- Agrostis capillaris* *aristulata* Hitchc. Wash. Biol. Soc. Proc. 41: 160. 1928. Alexandria, Va. Amer. Gr. Natl. Herb. 344.
- (2) *Agrostis thurberiana* Hitchc., U. S. Dept. Agr., Bur. Plant Indus. Bul. 68: 23. pl. 1. f. 1. 1905. Skamania County, Wash., Suksdorf 1021.
- Agrostis hillebrandii* Thurb. ex Boland. Agr. Soc. Calif. Trans. 1864-1865: 136. 1866. Name only. Sierra Nevada, Calif., Hillebrand.
- Agrostis atrata* Rydb., Torrey Bot. Club Bul. 36: 531. 1909. Yoho Valley, British Columbia, Macoun 64787.
- (23) *Agrostis variabilis* Rydb., N. Y. Bot. Gard. Mem. 1: 32. 1900. Based on *A. varians* Trin.
- Agrostis varians* Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4: 314. 1841. Not *A. varians* Thuill., 1790. "America boreal? (Hooker 217)." A duplicate type in the Torrey Herbarium (N. Y. Bot. Gard.) is labeled "Rocky Mountains, Hooker 217."

(59) AIRA L.

- (2) *Aira caryophyllea* L., Sp. Pl. 66. 1753. Europe.
- Avena caryophyllea* Wigg., Prim. Fl. Hols. 10. 1780. Based on *Aira caryophyllea* L.
- Agrostis caryophyllea* Salisb., Prodr. Stirp. 25. 1796. Based on *Aira caryophyllea* L.
- Airopsis caryophyllea* Fries, Nov. Fl. Suec. ed. 2. Cont. 3: 180. 1842. Based on *Aira caryophyllea* L.
- Caryophyllea airoides* Opiz, Sezn. Rostl. České 27. 1852. Based on *Aira caryophyllea* L.
- Fussia caryophyllea* Schur, Enum. Pl.

- Transsilv. 754. 1866. Based on *Aira caryophyllea* L.
- Airella caryophyllea* Dum., Soc. Bot. Belg. Bul. 7: 68. 1868. Based on *Aira caryophyllea* L.
- Salmasia vulgaris* Bubani, Fl. Pyr. 4: 316. 1901. Based on *Aira caryophyllea* L.
- Aspris caryophyllea* Nash in Britt. and Brown, Illustr. Fl. ed. 2. 1: 214. 1913. Based on *Aira caryophyllea* L.
- (3) *Aira elegans* Willd. ex Gaudin, Agrost. Helv. 1: 130, 355. 1811. Pavia, Italy.
- Aira capillaris* Host, Icon. Gram. Austr. 4: 20. pl. 35. 1809. Not *A. capillaris* Savi, 1798, nor *A. capillaris* Lag., 1805. Europe.
- Avena capillaris* Mert. and Koch in Roehl., Deut. Fl. ed. 3. 1²: 573. 1823. Based on *Aira capillaris* Host.
- Aiopsis capillaris* Schur, Oesterr. Bot. Ztschr. 9: 328. 1859. Based on *Aira capillaris* Host.
- Fussia capillaris* Schur, Enum. Pl. Transsilv. 754. 1866. Based on *Aira capillaris* Host.
- Airella capillaris* Dum., Soc. Bot. Belg. Bul. 7: 68. 1868. Based on *Aira capillaris* Host.
- Aspris capillaris* Hitchc., U. S. Dept. Agr. Bul. 772: 116. 1920. Based on *Aira capillaris* Host.
- (1) *Aira praecox* L., Sp. Pl. 65. 1753. Europe.
- Agrostis praecox* Salisb., Prodr. Stirp. 24. 1796. Based on *Aira praecox* L.
- Avena praecox* Beauv., Ess. Agrost. 89, 154. 1812. Based on *Aira praecox* L.
- Trisetum praecox* Dum., Obs. Gram. Belg. 122. pl. 8. f. 30. 1823. Based on *Aira praecox* L.
- Aiopsis praecox* Fries, Nov. Fl. Suec. ed. 2. Cont. 3: 180. 1842. Based on *Aira praecox* L.
- Caryophyllea praecox* Opiz, Sezn. Rostl. České 27. 1852. Based on *Aira praecox* L.
- Fussia praecox* Schur, Enum. Pl. Transsilv. 754. 1866. Based on *Aira praecox* L.
- Airella praecox* Dum., Soc. Bot. Belg. Bul. 7: 68. 1868. Based on *Aira praecox* L.
- Salmasia praecox* Bubani, Fl. Pyr. 4: 316. 1901. Based on *Aira praecox* L.
- Aspris praecox* Nash, in Britt. and Brown, Illus. Fl. ed. 2. 1: 215. 1913. Based on *Aira praecox* L.
- (76) **ALOPECURUS L.**
- (5) *Alopecurus aequalis* Sobol., Fl. Petrop. 16. 1799. Greece.
- Alopecurus aristulatus* Michx., Fl. Bor. Amer. 1: 43. 1803. Canada, Michaux.
- Alopecurus fulvus* J. E. Smith in Sowerby, English Bot. 21: pl. 1467. 1805. England.
- Alopecurus subaristatus* Pers., Syn. Pl. 1: 80. 1805. Canada.
- Alopecurus geniculatus* var. *natans* Wahl., Fl. Lapp. 22. 1812. Lapland.
- Alopecurus geniculatus* var. *aristulatus* Torr., Fl. North. and Mid. U. S. 1: 97. 1823. Based on *A. aristulatus* Michx.
- Alopecurus caespitosus* Trin., Gram. Icon. 3: pl. 241. 1836. North America, [type, Northwest America, Douglas].
- Alopecurus geniculatus* var. *fulvus* Schrad., Linnaea 12: 424. 1838. Based on *A. fulvus* J. E. Smith.
- Alopecurus geniculatus* var. *robustus* Vasey, Torrey Bot. Club Bul. 15: 13. 1888. Vancouver Island, Macoun.
- Alopecurus howellii* var. *merrimani* Beal, Grasses N. Amer. 2: 278. 1896. Pribilof Islands, Alaska, "C. H. Merri-man" [error for Merriam].
- Alopecurus howellii* var. *merriami* Beal, ex Macoun, in Jordan, Fur Seals North Pacif. 3: 573. 1899. (Correction of var. *merrimani* Beal.)
- Alopecurus aristulatus* var. *natans* Simmons, Arkiv Bot. 6¹⁷: 4. 1907. Based on *A. geniculatus* var. *natans* Wahl.
- Tozzettia fulva* Lunell, Amer. Midl. Nat. 4: 216. 1915. Based on *Alopecurus fulvus* J. E. Smith.
- Alopecurus aristulatus* var. *merriami* St. John, Canada Dept. Mines Mem. 126: 42. 1922. Based on *A. howellii* var. *merriami* Beal.
- Alopecurus aequalis* var. *natans* Fernald, Rhodora 27: 198. 1925. Based on *Alopecurus geniculatus* var. *natans* Wahl.
- (3) *Alopecurus alpinus* J. E. Smith in Sowerby, English Bot. pl. 1126. 1803. Scotland.
- ?*Alopecurus borealis* Trin., Fund. Agrost. 58. 1820. Asia and North America.
- Alopecurus occidentalis* Scribn. and Tweedy, Bot. Gaz. 11: 170. 1886. Yellowstone National Park, Tweedy.
- Alopecurus behringianus* Gandog., Soc. Bot. France Bul. 66⁷: 298. 1920. St. Paul Island, Alaska, Macoun.
- Vasey misapplied the name *Alopecurus pratensis* var. *alpestris* Wahl. to this species in U. S. Natl. Herb. Contrib. 3: 86. 1892.
- Alopecurus arundinaceus* Poir. in Lam. Encycl. 8: 766. 1808. Cultivated in Botanical Garden, Paris.
- Alopecurus ventricosus* Pers. Syn. Pl. 1: 80. 1805. Not *A. ventricosus* (Gouan) Huds., 1778. France.
- Alopecurus pratensis* var. *ventricosus* Coss. and Dur. Expl. Sci. Alger. 2: 56. 1854-55. Based on *Alopecurus ventricosus* Pers.
- (7) *Alopecurus carolinianus* Walt., Fl. Carol. 74. 1788. South Carolina.
- Alopecurus ramosus* Poir. in Lam., Encycl. 8: 776. 1808. Carolina, Bosc.
- Alopecurus pedalis* Bosc. ex Beauv., Ess. Agrost. 4. 1812. Name only. [Carolina, Bosc.]
- Alopecurus gracilis* Willd. ex Trin., Acad.

- St. Pétersb. Mém. VI. Sci. Nat. 4¹: 38. 1840. Carolina [Bosc].
- Alopecurus macounii* Vasey, Torrey Bot. Club Bul. 15: 12. 1888. Oak Bay, Vancouver Island, Macoun.
- Alopecurus geniculatus* var. *caespitosus* Scribn., in Macoun, Can. Pl. Cat. 2⁵: 389. 1890. Yale, British Columbia, Macoun.
- Alopecurus geniculatus* var. *ramosus* St. John, Rhodora 19: 167. 1917. Based on *A. ramosus* Poir.
- Alopecurus creticus** Trin. in Spreng., Neu. Entd. 2: 45. 1821. Crete.
- (6) **Alopecurus geniculatus** L., Sp. Pl. 60. 1753. Europe.
- Tozzettia geniculata* Bubani, Fl. Pyr. 4: 275. 1901. Based on *Alopecurus geniculatus* L.
- (8) **Alopecurus howellii** Vasey, Torrey Bot. Club Bul. 15: 12. 1888. [Medford], Oreg., Howell [215].
- Alopecurus californicus* Vasey, Torrey Bot. Club Bul. 15: 13. 1888. California [type, Santa Cruz, Anderson] and Oregon.
- (1) **Alopecurus myosuroides** Huds., Fl. Angl. 23. 1762. England.
- Alopecurus agrestis* L., Sp. Pl. ed. 2. 1: 89. 1762. Europe.
- Tozzettia agrestis* Bubani, Fl. Pyr. 4: 274. 1901. Based on *Alopecurus agrestis* L.
- (4) **Alopecurus pallescens** Piper, Fl. Palouse 18. 1901. Pullman, Wash., Piper 1743.
- (2) **Alopecurus pratensis** L., Sp. Pl. 60. 1753. Europe.
- Alopecurus rendlei** Eig, Brit. and For. Jour. Bot. 75: 187. 1937. Based on *Phalaris utriculata* L., not *Alopecurus utriculatus* Banks and Solander.
- Phalaris utriculata* L. Syst. Nat. ed. 10. 869. 1759.
- Alopecurus utriculatus* Pers., Syn. Pl. 1: 80. 1805. Not *Alopecurus utriculatus* Banks and Solander, 1794. Based on *Phalaris utriculata* L.
- (9) **Alopecurus saccatus** Vasey, Bot. Gaz. 6: 290. 1881. Eastern Oregon, Howell.
- (68) **AMMOPHILA** Host
- (2) **Ammophila arenaria** (L.) Link, Hort. Berol. 1: 105. 1827. Based on *Arundo arenaria* L.
- Arundo arenaria* L., Sp. Pl. 82. 1753. Europe.
- Calamagrostis arenaria* Roth, Tent. Fl. Germ. 1: 34. 1788. Based on *Arundo arenaria* L.
- Ammophila arundinacea* Host, Icon. Gram. Austr. 4: 24. pl. 41. 1809. Based on *Arundo arenaria* L.
- Psamma littoralis* Beauv., Ess. Agrost. 144. pl. 6. f. 1. 176. 1812. Europe.
- Psamma arenaria* Roem. and Schult., Syst. Veg. 2: 845. 1817. Based on *Calamagrostis arenaria* Roth.
- Phalaris maritima* Nutt., Gen. Pl. 1: 48.

1818. Based on *Arundo arenaria* L., but misapplied to *Ammophila breviligulata*.
- Phalaris ammophila* Link, Enum. Hort. Berol. 1: 66. 1821. Based on *Ammophila arundinacea* Host.
- Arundo littoralis* Beauv. ex Steud., Nom. Bot. ed. 2. 1: 144. 1840, as synonym of *Calamagrostis arenaria* Roth.
- (1) **Ammophila breviligulata** Fernald, Rhodora 22: 71. 1920. Milford, Conn., Bissell in 1902.

- Ampelodesmos mauritanicus** (Poir.) Dur. and Schinz, Consp. Fl. Afr. 5: 874. 1894. Based on *Arundo mauritanica* Poir.
- Arundo mauritanica* Poir., Voy. Barb. 2: 104. 1789. Algeria.
- Arundo tenax* Vahl, Symb. Bot. 2: 25. 1791. Tunis.
- Ampelodesmos tenax* Link, Hort. Berol. 1: 136. 1827. Based on *Arundo tenax* Vahl.

(146) **AMPHICARPUM** Kunth

- (2) **Amphicarpum muhlenbergianum** (Schult.) Hitchc., Bartonica 14: 34. 1932. Based on *Milium muhlenbergianum* Schult.
- Milium ? muhlenbergianum* Schult., Mantissa 2: 178. 1824. Based on *Milium* No. 3 of Muhlenberg's Descriptio Graminum. Muhlenberg's specimen is without locality.
- Amphicarpon floridanum* Chapm., Fl. South. U. S. 572. 1860. Apalachicola River, Fla.
- (1) **Amphicarpum purshii** Kunth, Rév. Gram. 1: 28. 1829. Based on *Milium amphicarpon* Pursh.
- Milium amphicarpon* Pursh, Fl. Amer. Sept. 1: 62. pl. 2. 1814. Egg Harbor, N. J.
- Milium ciliatum* Muhl., Descr. Gram. 77. 1817. Not *M. ciliatum* Moench, 1802. New Jersey. Name only, Muhl., Cat. Pl. 10. 1813.
- Amphicarpon amphicarpon* Nash, Torrey Bot. Club Mem. 5: 352. 1894. Based on *Milium amphicarpon* Pursh.

(154) **ANDROPOGON** L.

- (19) **Andropogon arctatus** Chapm., Bot. Gaz. 3: 20. 1878. West Florida, Chapman [in 1875].
- Andropogon tetrastachyus* var. *distachyus* Chapm., Fl. South. U. S. 581. 1860. No locality cited. [Type specimen of *A. arctatus* is also type of this.]
- Sorghum arctatum* Kuntze, Rev. Gen. Pl. 2: 791. 1891. Based on *Andropogon arctatus* Chapm.
- (33) **Andropogon barbinodis** Lag., Gen. et Sp. Nov. 3. 1816. Mexico, Sessé.
- Andropogon leucopogon* Nees, Linnaea 19: 694. 1845. Mexico, Aschenborn 141.

- Andropogon saccharoides* var. *barbinodis* Hack. in DC., Monogr. Phan. 6: 494. 1889. Based on *A. barbinodis* Lag.
- Andropogon saccharoides* var. *leucopogon* Hack. in DC., Monogr. Phan. 6: 496. 1889. Based on *A. leucopogon* Nees.
- Amphilophis barbinodis* Nash in Small, Fl. Southeast. U. S. 65. 1903. Based on *Andropogon barbinodis* Lag.
- Holcus saccharoides* var. *barbinodis* Hack. ex Stuck., An. Mus. Nac. Buenos Aires 11: 48. 1904. Presumably based on *Andropogon barbinodis* Lag.
- Amphilophis leucopogon* Nash, N. Amer. Fl. 17: 126. 1912. Based on *Andropogon leucopogon* Nees.
- Bothriochloa barbinodis* Herter, Sudamer. Bot. Rev. 6: 135. 1940. Based on *Andropogon barbinodis* Lag.
- (24) *Andropogon brachystachyus* Chapm., Fl. South. U. S. ed. 2. 668. 1883. [Jacksonville], Fla., Curtiss [3632].
- Sorghum brachystachyus* Kuntze, Rev. Gen. Pl. 2: 791. 1891. Based on *Andropogon brachystachyus* Chapm.
- (17) *Andropogon cabanisii* Hack., Flora 68: 133. 1885. "Pennsylvania" [erroneous] and Florida, *Cabanis*.
- Sorghum cabanisii* Kuntze, Rev. Gen. Pl. 2: 791. 1891. Based on *Andropogon cabanisii* Hack.
- Andropogon ternarius* var. *cabanisii* Fern. and Grise., Rhodora 37: 138. 1935. Based on *A. cabanisii* Hack.
- (30) *Andropogon campyloracheus* Nash, N. Y. Bot. Gard. Bul. 1: 431. 1900. Eustis, Fla., Nash 1738.
- Andropogon elliotii* var. *laxiflorus* Scribn., Torrey Bot. Club Bul. 23: 146. 1896 (Apr.). Eustis, Fla., Nash 1738. Published as new in Beal, Grasses N. Amer. 2: 51. 1896 (Nov.), Nash 1597 cited as type.
- (25) *Andropogon capillipes* Nash, N. Y. Bot. Gard. Bul. 1: 431. 1900. Based on *A. virginicus* var. *glaucus* Hack.
- Andropogon glaucus* Muhl., Descr. Gram. 278. 1817. Not *A. glaucus* Retz., 1789. South Carolina.
- Cymbopogon glaucus* Schult., Mantissa 2: 459. 1824. Based on *Andropogon glaucus* Muhl.
- Andropogon virginicus* var. *glaucus* Hack. in DC., Monogr. Phan. 6: 411. 1889. [Jacksonville], Fla., Curtiss 3638b.
- (5) *Andropogon cirratus* Hack., Flora 68: 119. 1885. El Paso, Tex., Wright 804 [error for 805].
- Sorghum cirratum* Kuntze, Rev. Gen. Pl. 2: 791. 1891. Based on *Andropogon cirratus* Hack.
- Schizachyrium cirratum* Woot. and Standl., N. Mex. Col. Agr. Bul. 81: 30. 1912. Based on *Andropogon cirratus* Hack.
- (10) *Andropogon divergens* (Hack.) Anderss. ex Hitchc., Wash. Acad. Sci. Jour. 23: 456. 1933. Based on *A. scoparius* subsp. *maritimus* var. *divergens* Hack.
- Andropogon scoparius* subsp. *maritimus* var. *divergens* Hack. in DC., Monogr. Phan. 6: 385. 1889. Texas.
- Andropogon divergens* Anderss. ex Hack., in DC., Monogr. Phan. 6: 385. 1889, as synonym of *A. scoparius* subsp. *maritimus* var. *divergens* Hack.
- (28) *Andropogon elliotii* Chapm., Fl. South. U. S. 581. 1860. Florida to North Carolina. Chapman erroneously cites "*A. argenteus* Ell., not of DC." but his description, especially of the "dilated clustered sheaths" shows that he did not know Elliott's species (see synonymy under *A. ternarius* Michx.), but was describing plants of his own collection, one of which from Chapman's herbarium named "*Andropogon Elliottii* S. Fl." in his script is in the U. S. National Herbarium.
- Andropogon clandestinus* Wood, Class-book ed. 1861, 809. 1861. Not *A. clandestinus* Nees, 1854. Western Louisiana.
- Andropogon elliotii* var. *gracilior* Hack. in DC., Monogr. Phan. 6: 415. 1889. [Jacksonville], Fla., Curtiss 3636a.
- Sorghum elliotii* Kuntze, Rev. Gen. Pl. 2: 791. 1891. Based on *A. elliotii* Chapm.
- ? *Andropogon gyrans* Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 113. 1898. Durham County, N. C., Ashe.
- Andropogon gracilior* Nash in Small, Fl. Southeast. U. S. 63. 1903. Based on *A. elliotii* var. *gracilior* Hack.
- Andropogon elliotii* var. *projectus* Fern. and Grise., Rhodora 37: 139. 1935. Biltmore, N. C., Biltmore Herb. No. 1421c.
- (35) *Andropogon exaristatus* (Nash) Hitchc., Biol. Soc. Wash. Proc. 41: 163. 1928. Based on *Amphilophis exaristatus* Nash.
- Andropogon saccharoides* var. *submuticus* Vasey ex Hack., in DC., Monogr. Phan. 6: 495. 1889. Not *A. submuticus* Steud., 1854. Texas, Nealley.
- Amphilophis exaristatus* Nash in Small, Fl. Southeast. U. S. 65. 1903. Based on *Andropogon saccharoides* var. *submuticus* Vasey.
- Bothriochloa exaristata* Henr., Blumea 4: 520. 1941. Based on *Amphilophis exaristatus* Nash.
- (20) *Andropogon floridanus* Scribn., Torrey Bot. Club Bul. 23: 145. 1896. [Eustis], Fla., Nash 1572.
- Andropogon bakeri* Scribn. and Ball, U. S. Dept. Agr., Div. Agrost. Bul. 24: 39. 1901. Grasmere, Fla., C. H. Baker 58.
- (14) *Andropogon gerardi* Vitman, Summa Pl. 6: 16. 1792. Based on the diagnosis and figure in Gerard, Fl. Gallo-provincialis 107. f. 4. 1761. Provence, France.
- Andropogon provincialis* Lam. Encycl. 1:

376. 1785. Not Retz., 1783. Based on Gerard's diagnosis and figure, and a plant in the Botanic Garden in Paris.
- Andropogon furcatus* Muhl. in Willd., Sp. Pl. 4: 919. 1806. North America [probably Pennsylvania].
- ?*Andropogon ternarius* [Michx. misapplied by] Bertol., Accad. Sci. Bologna Mem. 2: 600. 1850. Alabama.
- Andropogon provincialis* subvar. *furcatus* Hack. in DC., Monogr. Phan. 6: 442. 1889. Based on *A. furcatus* Muhl.
- Andropogon provincialis* subvar. *lindheimeri* Hack. in DC., Monogr. Phan. 6: 443. 1889. Texas, *Lindheimer* 741.
- Andropogon provincialis* subvar. *pycnanthus* Hack. in DC., Monogr. Phan. 6: 443. 1889. Texas, *Vincent* 69.
- Andropogon provincialis* var. *tennesseensis* Scribn., Tenn. Agr. Expt. Sta. Bul. 7²: 23. 1894. Tennessee.
- Andropogon hallii* var. *grandiflorus* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 5: 21. 1897. Colorado, *Shear* 747 [type], 605, 2366.
- Andropogon tennesseensis* Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 16: 1. 1899. Based on *A. provincialis* var. *tennesseensis* Scribn.
- (27) *Andropogon glomeratus* (Walt.) B. S. P., Prel. Cat. N. Y. 67. 1888. Based on *Cinna glomerata* Walt.
- Cinna glomerata* Walt., Fl. Carol. 59. 1788. South Carolina.
- Andropogon macrourus* Michx., Fl. Bor. Amer. 1: 56. 1803. Carolina to Florida, *Michaux*. [Type labeled "Virginia to Carolina."]
- Andropogon spathaceus* Trin., Fund. Agrost. 186. 1820, name only; Steud., Nom. Bot. ed. 2. 1: 93. 1840, as synonym of *A. macrourus* Michx.
- Anatherum macrourum* Griseb., Amer. Acad. Mem. (n.s.) 8: 534. 1863. Based on *Andropogon macrourus* Michx.
- Andropogon macrourus* var. *abbreviatus* Hack. in DC., Monogr. Phan. 6: 408. 1889. [Pleasant Bridge], N. J., *Gray*.
- Andropogon macrourus* var. *corymbosus* Chapm. ex Hack. in DC., Monogr. Phan. 6: 409. 1889. [Jacksonville], Fla., *Curtiss* 3639c.
- Sorghum glomeratum* Kuntze, Rev. Gen. Pl. 2: 790. 1891. Based on *Cinna glomerata* Walt.
- Dimeiostemon macrurus* Raf. ex Jacks., Ind. Kew. 1: 760. 1893, as synonym of *Andropogon macrourus* Michx.
- Andropogon glomeratus* var. *corymbosus* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 7 (ed. 3): 15. 1900. Based on *A. macrourus* var. *corymbosus* Chapm.
- Andropogon glomeratus* var. *abbreviatus* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 7 (ed. 3): 15. 1900. Based on *A. macrourus* var. *abbreviatus* Hack.
- Andropogon corymbosus* Nash in Britton,
- Man. 69. 1901. Based on *A. macrourus* var. *corymbosus* Chapm.
- Andropogon corymbosus abbreviatus* Nash in Britton, Man. 70. 1901. Based on *A. macrourus* var. *abbreviatus* Hack.
- Andropogon glomeratus tenuispatheus* Nash in Small, Fl. Southeast. U. S. 61. 1903. Florida [type] to New Mexico.
- Andropogon tenuispatheus* Nash, N. Amer. Fl. 17: 113. 1912. Based on *A. glomeratus tenuispatheus* Nash.
- Andropogon virginicus* var. *corymbosus* Fern. and Grise., Rhodora 37: 142. pl. 338. f. 2. 1935. Based on *A. macrourus* var. *corymbosus* Chapm.
- Andropogon virginicus* var. *abbreviatus* Fern. and Grise., Rhodora 37: 142. pl. 338. f. 3. 1935. Based on *A. macrourus* var. *abbreviatus* Hack.
- Andropogon virginicus* var. *tenuispatheus* Fern. and Grise., Rhodora 37: 142. pl. 338. f. 1. 1935. Based on *A. glomeratus tenuispatheus* Nash.
- Andropogon virginicus* var. *hirsutior* forma *tenuispatheus* Fernald, Rhodora 42: 416. 1940. Based on *A. glomeratus tenuispatheus* Nash.
- (1) *Andropogon gracilis* Spreng., Syst. Veg. 1: 284. 1825. Hispaniola.
- Andropogon juncifolius* Desv. ex Hamilt., Prodr. Pl. Ind. Occ. 9. 1825. St. Croix, Virgin Islands.
- Sorghum gracile* Kuntze, Rev. Gen. Pl. 2: 791. 1891. Based on *Andropogon gracilis* Spreng.
- Schizachyrium gracile* Nash in Small, Fl. Southeast. U. S. 60. 1903. Based on *Andropogon gracilis* Spreng.
- (15) *Andropogon hallii* Hack., Sitzungsber. Akad. Wiss. Math. Naturw. (Wien) 89¹: 127. 1884. North America [Nebraska], *Hall* and *Harbour* 651.
- Andropogon hallii* var. *flaveolus* Hack., Sitzungsber. Akad. Wiss. Math. Naturw. (Wien) 89¹: 128. 1884. [Nebraska] *Hall* and *Harbour* 651.
- Andropogon hallii* var. *incanescens* Hack., Sitzungsber. Akad. Wiss. Math. Naturw. (Wien) 89¹: 128. 1884. [Nebraska] *Hall* and *Harbour*.
- Andropogon hallii* var. *muticus* Hack. in DC., Monogr. Phan. 6: 444. 1889. Brighton, Colo., *Vasey*.
- Sorghum hallii* Kuntze, Rev. Gen. Pl. 2: 791. 1891. Based on *Andropogon hallii* Hack.
- Andropogon geminatus* Hack. ex Beal, Grasses N. Amer. 2: 55. 1896. Texas, *Nealley*.
- Andropogon hallii* var. *bispicata* Vasey ex Beal, Grasses N. Amer. 2: 55. 1896, as synonym of *A. geminatus* Hack.
- Andropogon chrysocomus* Nash in Britton, Man. 70. 1901. Kansas [type, Stevens County, *Carleton* 343] and Texas.
- Andropogon paucipilus* Nash in Britton, Man. 70. 1901. Montana and Nebraska

- [type, Whitman, *Rydberg* 1607].
Andropogon provincialis var. *paucipilus* Fern. and Grise., *Rhodora* 37: 147. 1935. Based on *A. paucipilus* Nash.
Andropogon provincialis var. *chrysocomus* Fern. and Grise., *Rhodora* 37: 147. 1935. Based on *A. chrysocomus* Nash.
Andropogon gerardi var. *chrysocomus* Fernald, *Rhodora* 45: 258. 1943. Based on *A. chrysocomus* Nash.
Andropogon gerardi var. *paucipilus* Fernald, *Rhodora* 45: 258. 1943. Based on *A. paucipilus* Nash.
- (3) *Andropogon hirtiflorus* (Nees) Kunth, Rév. Gram. 1: Sup. 39. 1830. Based on *Schizachyrium hirtiflorum* Nees.
Streptachne domingensis Spreng. ex Schult., *Mantissa* 2: 188. 1824. Not *Andropogon domingensis* Steud., 1821. Santo Domingo, Bertero.
Schizachyrium hirtiflorum Nees, *Agrost. Bras.* 334. 1829. Brazil, *Sellow*.
Aristida domingensis Kunth, Rév. Gram. 1: 62. 1829. Based on *Streptachne domingensis* Spreng.
Andropogon oligostachyus Chapm., *Fl. South. U. S.* 581. 1860. Middle Florida, *Chapman*.
Andropogon hirtiflorus var. *oligostachyus* Hack. in DC., *Monogr. Phan.* 6: 372. 1889. Based on *A. oligostachyus* Chapm.
Sorghum hirtiflorum Kuntze, *Rev. Gen. Pl.* 2: 792. 1891. Based on *Schizachyrium hirtiflorum* Nees.
Schizachyrium oligostachyum Nash in Small, *Fl. Southeast. U. S.* 59. 1903. Based on *Andropogon oligostachyus* Chapm.
Schizachyrium domingense Nash, *N. Amer. Fl.* 17: 103. 1912. Based on *Streptachne domingensis* Spreng.
Andropogon domingensis Hubb., *Amer. Acad. Sci. Proc.* 49: 493. 1913. Not *A. domingensis* Steud., 1821. Based on *Streptachne domingensis* Spreng.
- ANDROPOGON HIRTIFLORUS var. FEENSIS (Fourn.) Hack. in DC., *Monogr. Phan.* 6: 372. 1889. Based on *A. feensis* Fourn.
Andropogon feensis Fourn., *Mex. Pl.* 2: 62. 1886. Santa Fé, Mexico, *Bourgeau* 752.
Andropogon hirtiflorus var. *brevipedicellatus* Beal, *Grasses N. Amer.* 2: 44. 1896. Chihuahua, Mexico, *Pringle* 383.
Andropogon myosurus var. *feensis* Urbina, *Pl. Mex. Cat.* 379. 1897. Presumably based on *A. feensis* Fourn.
Schizachyrium feense A. Camus, *Ann. Soc. Linn. Lyon* 70: 89. 1923. Based on *Andropogon feensis* Fourn.
- Andropogon ischaemum* L., *Sp. Pl.* 1047. 1753. Southern Europe.
- (9) *Andropogon littoralis* Nash in Britton, *Man.* 69. 1901. New York [type, Staten Island, Nash in 1894] and New Jersey.
Andropogon scoparius subsp. *euscoparius* Hack. ex Beal, *Grasses N. Amer.* 2: 46. 1896. Cape May, N. J., *Burk* in 1881 (misprinted as 1888).
Andropogon scoparius var. *littoralis* Hitchc., *Rhodora* 8: 205. 1906. Based on *A. littoralis* Nash.
Schizachyrium littorale Bicknell, *Torrey Bot. Club Bul.* 35: 182. 1908. Based on *Andropogon littoralis* Nash.
Andropogon scoparius var. *ducis* Fern. and Grise., *Rhodora* 37: 145. pl. 340. f. 1. 2. 1935. West End Point, Naushon, Elizabeth Island, Mass., *Fogg* 2940.
- (22) *Andropogon longiberbis* Hack., *Flora* 68: 131. 1885. Florida, *Garber* [in 1877].
Sorghum longiberbe Kuntze, *Rev. Gen. Pl.* 2: 792. 1891. Based on *Andropogon longiberbis* Hack.
- (11) *Andropogon maritimus* Chapm., *Fl. South. U. S.* ed. 2: 668. 1883. West Florida, *Chapman*.
Andropogon scoparius subsp. *maritimus* Hack. in DC., *Monogr. Phan.* 6: 385. 1889. Based on *A. maritimus* Chapm.
Schizachyrium maritimum Nash in Small, *Fl. Southeast. U. S.* 59. 1903. Based on *Andropogon maritimus* Chapm.
- (16) *Andropogon mohrii* (Hack.) Hack. ex Vasey, *U. S. Natl. Herb. Contrib.* 3: 11. 1892. Based on *A. liebmanni* subvar. *mohrii* Hack.
Andropogon liebmanni subvar. *mohrii* Hack. in DC., *Monogr. Phan.* 6: 413. 1889. Mobile, Ala., *Mohr* [in 1884].
Andropogon mohrii var. *pungensis* Ashe, *Elisha Mitchell Sci. Soc. Jour.* 15: 114. 1898. Washington County, N. C., *Ashe*.
- (6) *Andropogon niveus* Swallen, *Wash. Acad. Sci. Jour.* 31: 354. f. 7. 1941. Kissimmee, Fla., *Silveus* 6684.
- Andropogon nodosus* (Willem.) Nash, *N. Amer. Fl.* 17: 122. 1912. Based on *Dichanthium nodosum* Willem.
Dichanthium nodosum Willem., *Ann. Bot. Usteri* 18: 11. 1796. Mauritius.
Andropogon mollicomus Kunth, Rév. Gram. 1: 365. 1830. Mauritius.
Andropogon caricosus var. *mollicomus* Hack. in DC., *Monogr. Phan.* 6: 569. 1889. Based on *A. mollicomus* Kunth.
- (23) *Andropogon perangustatus* Nash in Small, *Fl. Southeast. U. S.* 62. 1903. Based on *A. virginicus* var. [*viridis* sub-var.] *stenophyllus* Hack.
Andropogon virginicus var. *viridis* subvar. *stenophyllus* Hack. in DC., *Monogr. Phan.* 6: 411. 1889. Not *A. stenophyllus* Roem. and Schult., 1817. Florida, *Chapman* [in 1884].
Andropogon virginicus var. *stenophyllus* Fern. and Grise., *Rhodora* 37: 142. 1935. Based on *A. virginicus* var. *viridis* subvar. *stenophyllus* Hack.

- (32) *Andropogon perforatus* Trin. ex Fourn., Mex. Pl. 2: 59. 1886. [Mexico City] Mexico, *Berlandier* 641.
Andropogon emersus Fourn., Mex. Pl. 2: 58. 1886. Orizaba, Mexico, *Mueller* 2033.
Andropogon saccharoides var. *leucopogon* subvar. *perforatus* Hack. in DC., Monogr. Phan. 6: 496. 1889. Based on *A. perforatus* Trin.
Andropogon saccharoides var. *perforatus* Hack. ex L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 497. 1894. Presumably based on *A. perforatus* Trin.
Amphilophis perforatus Nash in Small, Fl. Southeast. U. S. 66. 1903. Based on *Andropogon perforatus* Trin.
Holcus saccharoides var. *perforatus* Hack. ex Stuck., An. Mus. Nac. Buenos Aires 11: 48. 1904. Presumably based on *Andropogon perforatus* Trin.
Amphilophis emersus Nash, N. Am. Fl. 17: 126. 1912. Based on *Andropogon emersus* Fourn.
Bothriochloa perforata Herter, Rev. Sudamer. Bot. 6: 135. 1940. Based on *Andropogon perforatus* Trin.
Bothriochloa emersa Henr., Blumea 4: 520. 1941. Based on *Andropogon emersus* Fourn.
Andropogon pertusus (L.) Willd., Sp. Pl. 4: 922. 1806. Based on *Holcus pertusus* L.
Holcus pertusus L., Mant. Pl. 2: 301. 1771. East Indies.
Bothriochloa pertusa A. Camus, Ann. Soc. Linn. Lyon n. ser. 76 (1930): 164. 1931. Based on *Holcus pertusus* L.
- (12) *Andropogon rhizomatus* Swallen, Wash. Acad. Sci. Jour. 31: 352. f. 6. 1941. Homestead, Fla., *Silveus* 6614.
- (34) *Andropogon saccharoides* Swartz, Prodr. Veg. Ind. Occ. 26. 1788. Jamaica, *Swartz*.
Andropogon argenteus DC., Cat. Hort. Monsp. 77. 1813. Mexico, *Sessé*.
Andropogon laguroides DC., Cat. Hort. Monsp. 78. 1813. Grown from Mexican seed.
Andropogon glaucus Torr., Ann. Lyc. N. Y. 1: 153. 1824. Not *A. glaucus* Retz., 1789. Canadian River, Tex., *James*.
Trachypogon argenteus Nees, Agrost. Bras. 348. 1829. Based on *Andropogon argenteus* DC.
Trachypogon laguroides Nees, Agrost. Bras. 349. 1829. Based on *Andropogon laguroides* DC.
Andropogon torreyanus Steud., Nom. Bot. ed. 2. 1: 93. 1840. Based on *A. glaucus* Torr.
Andropogon jamesii Torr. in Marcy, Expl. Red. Riv. 302. 1853. Based on *A. glaucus* Torr.
Andropogon saccharoides var. *laguroides* Hack. in Mart., Fl. Bras. 2^a: 293. 1883. Based on *A. laguroides* DC.
Andropogon tenuirachis Fourn., Mex. Pl. 2: 58. 1886. Mexico.
Andropogon saccharoides var. *torreyanus* Hack. in DC., Monogr. Phan. 6: 495. 1889. Based on *A. torreyanus* Steud.
Sorghum saccharoides Kuntze, Rev. Gen. Pl. 2: 792. 1891. Based on *Andropogon saccharoides* Swartz.
Andropogon saccharoides var. *glaucus* Scribn., Torrey Bot. Club Mem. 5: 28. 1894. Based on *A. glaucus* Torr.
Amphilophis torreyanus Nash in Britton, Man. 71. 1901. Based on *Andropogon torreyanus* Steud.
Holcus saccharoides Kuntze ex Stuck., An. Mus. Nac. Buenos Aires 11: 48. 1904. Presumably based on *Andropogon saccharoides* Swartz.
Holcus saccharoides var. *laguroides* Hack. ex Stuck., An. Mus. Nac. Buenos Aires 11: 48. 1904. Presumably based on *Andropogon laguroides* DC.
Amphilophis saccharoides Nash, N. Amer. Fl. 17: 125. 1912. Based on *Andropogon saccharoides* Swartz.
Bothriochloa saccharoides Rydb., Brittonia 1: 81. 1931. Based on *Andropogon saccharoides* Swartz.
Bothriochloa laguroides Herter, Rev. Sudamer. Bot. 6: 135. 1940. Based on *Andropogon laguroides* DC.
- (8) *Andropogon scoparius* Michx., Fl. Bor. Amer. 1: 57. 1803. Carolina, *Michaux*.
Andropogon purpurascens Muhl. in Willd., Sp. Pl. 4: 913. 1806. North America [type received from Muhlenberg]. Listed by Muhlenberg in Amer. Phil. Soc. Trans. 4: 237. 1799. "Clayton 602" cited but without description.
Andropogon flexilis Bosc ex Poir. in Lam., Encyl. Sup. 1: 583. 1810. North America, *Bosc* [type, Carolina].
Pollinia scoparia Spreng., Pl. Pugill. 2: 13. 1815. Based on *Andropogon scoparius* Michx.
Andropogon halei Wood, Class-book ed. 1861. 809. 1861. [Louisiana, *Hale*.]
Andropogon scoparius subsp. *genuinus* Hack. in DC., Monogr. Phan. 6: 384. 1889. Based on *A. scoparius* Michx.
Andropogon scoparius subvar. *flexilis* Hack. in DC., Monogr. Phan. 6: 384. 1889. Based on *A. flexilis* Bosc.
Andropogon scoparius subvar. *caesia* Hack. in DC., Monogr. Phan. 6: 384. 1889. No locality cited. (Plants with pruinose sheaths.)
Andropogon scoparius subvar. *serpentinus* Hack. in DC., Monogr. Phan. 6: 384. 1889. No locality cited. (Plants with strongly flexuous rachis.)
Andropogon scoparius subvar. *simplicior* Hack. in DC., Monogr. Phan. 6: 384. 1889. No locality cited. (Sparingly branching plants.)
Sorghum scoparium Kuntze, Rev. Gen.

- Pl. 2: 792. 1891. Based on *Andropogon scoparius* Michx.
- Andropogon scoparius* var. *polycladus* Scribn. and Ball, U. S. Dept. Agr., Div. Agrost. Bul. 24: 40. 1901. "Braidenton" (Bradenton), Fla., Combs 1298.
- Andropogon scoparius* var. *villosissimus* Kearney in Scribn. and Ball, U. S. Dept. Agr., Div. Agrost. Bul. 24: 41. 1901. Waynesboro, Miss., Kearney 136. (Foliage villous.)
- Schizachyrium scoparium* Nash in Small, Fl. Southeast. U. S. 59. 1903. Based on *Andropogon scoparius* Michx.
- Schizachyrium villosissimum* Nash in Small, Fl. Southeast. U. S. 59, 1326. 1903. Based on *Andropogon scoparius* var. *villosissimus* Kearney.
- Schizachyrium acuminatum* Nash in Small, Fl. Southeast. U. S. 59, 1326. 1903. Starkville, Miss., Tracy in 1890. (Sessile spikelets 10 mm. long.)
- Andropogon scoparius* var. *frequens* Hubb., Rhodora 19: 103. 1917. Block Island, R. I., Fernald, Long, and Torrey 8476.
- Andropogon scoparius* var. *glaucescens* House, N. Y. State Mus. Bul. 254: 68. 1924. West of Albany, N. Y. [House 3 in 1918].
- Andropogon scoparius* var. *genuinus* Fern. and Grise., Rhodora 37: 143, 144. 1935. Based on *A. scoparius* Michx.
- Andropogon scoparius* var. *septrionalis* Fern. and Grise., Rhodora 37: 145. pl. 339, f. 1, 2. 1935. Canada, Rolland 19199.
- Andropogon praematurus* Fernald, Rhodora 42: 413. pl. 626. f. 1-3. 1940. Skipper's, Greenville County, Va., Fernald and Long 10092.
- Andropogon praematurus* forma *hirtivaginitus* Fernald, Rhodora 44: 383. 1942. Sussex County, Va., Fernald and Long 13248.
- Andropogon scoparius* var. *genuinus* forma *calvescens* Fernald, Rhodora 45: 390. 1943. Virginia, Fernald and Lewis 14474.
- ANDROPOGON SCOPARIUS** var. **NEOMEXICANUS** (Nash) Hitchc., Biol. Soc. Wash. Proc. 41: 163. 1928. Based on *A. neo-mexicanus* Nash.
- Andropogon neo-mexicanus* Nash, Torrey Bot. Club Bul. 25: 83. 1898. White Sands, Doña Ana County, N. Mex., Wooton [583] in 1897.
- Schizachyrium neo-mexicanum* Nash, N. Amer. Fl. 17: 107. 1912. Based on *Andropogon neo-mexicanus* Nash.
- (4) **Andropogon semiberbis** (Nees) Kunth, Rév. Gram. 1: Sup. 39. 1830. Based on *Schizachyrium semiberbe* Nees.
- Schizachyrium semiberbe* Nees, Agrost. Bras. 336. 1829. Brazil, Sellow.
- Andropogon vaginatus* Presl, Rel. Haenk. 1: 336. 1830. Not *A. vaginatus* Ell., 1816. Mexico, Haenke.
- Andropogon velatus* Kunth, Rév. Gram. 1: Sup. 39. 1830. Based on *A. vaginatus* Presl.
- Andropogon semiberbis* subvar. *pruinatus* Hack. in DC., Monogr. Phan. 6: 370. 1889. [Eau Gallie,] Fla., Curtiss 3633.
- Andropogon tener* Curtiss ex Hack. in DC., Monogr. Phan. 6: 370. 1889. Not *A. tener* Kunth, 1830. As synonym of *A. semiberbis* subvar. *pruinatus* Hack.
- Sorghum semiberbe* Kuntze, Rev. Gen. Pl. 2: 792. 1891. Based on *Schizachyrium semiberbe* Nees.
- Andropogon hirtiflorus* var. *semiberbis* Stapf in Dyer, Fl. Cap. 7: 337. 1898. Based on *A. semiberbis* Kunth.
- (7) **Andropogon sericatus** Swallen, Wash. Acad. Sci. Jour. 31: 355. f. 8. 1941. Ramrod Key, Fla., Silveus 6633.
- Andropogon sericeus** R. Br., Prodr. Fl. Nov. Holl. 1: 201. 1810. Australia.
- (13) **Andropogon stolonifer** (Nash) Hitchc., Amer. Jour. Bot. 2: 299. 1915. Based on *Schizachyrium stoloniferum* Nash.
- Schizachyrium stoloniferum* Nash in Small, Fl. Southeast. U. S. 59, 1326. 1903. Florida, Chapman.
- Schizachyrium triaristatum* Nash in Small, Fl. Southeast. U. S. 60, 1326. 1903. Florida, Chapman.
- (29) **Andropogon subtenuis** Nash in Small, Fl. Southeast. U. S. 63. 1903. Biloxi, Miss., Tracy 2243.
- (2) **Andropogon tener** (Nees) Kunth, Rév. Gram. 1: Sup. 39. 1830. Based on *Schizachyrium tenerum* Nees.
- Schizachyrium tenerum* Nees, Agrost. Bras. 336. 1829. Brazil, Sellow.
- Andropogon gracilis* Presl, Rel. Haenk. 1: 336. 1830. Not *A. gracilis* Spreng. 1825. Peru, Haenke.
- Andropogon preslii* Kunth, Rév. Gram. 1: Sup. 39. 1830. Based on *A. gracilis* Presl.
- Andropogon leptophyllus* Trin., Acad. St. Pétersb. Mém. VI. Math. Phys. Nat. 2: 264. 1832. Based on *Schizachyrium tenerum* Nees.
- Sorghum tenerum* Kuntze, Rev. Gen. Pl. 2: 792. 1891. Based on *Schizachyrium tenerum* Nees.
- (18) **Andropogon ternarius** Michx., Fl. Bor. Amer. 1: 57. 1803. Carolina, Michaux.
- Andropogon argenteus* Ell., Bot. S. C. and Ga. 1: 148. 1816. Not *A. argenteus* DC., 1813. Presumably South Carolina.
- Andropogon argyraeus* Schult., Mantissa 2: 450. 1824. Based on *A. argenteus* Ell.
- Andropogon muhlenbergianus* Schult., Mantissa 2: 455. 1824. Based on Muhlenberg's *Andropogon* No. 4. North Carolina.
- Andropogon belvisii* Desv., Opusc. 67. 1831. No locality cited.
- Sorghum argenteum* Kuntze, Rev. Gen.

- Pl. 2: 790. 1891. Based on *Andropogon argenteus* Ell.
- Andropogon argyraeus* var. *tenuis* Vasey, U. S. Natl. Herb. Contrib. 3: 12. 1892. Texas [Dallas, Reverchon 1161].
- Andropogon argyraeus macrus* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 1: 20. 1895. [Jacksonville,] Fla., *Curtiss* 4952. Published as new by Scribner and Ball (Hackel given as author), U. S. Dept. Agr., Div. Agrost. Bul. 24: 39. 1900, *Tracy* 3891 cited as type.
- Andropogon elliotii* var. *glaucescens* Scribn., Torrey Bot. Club Bul. 23: 145. 1896. Eustis, Fla., *Nash* 473.
- Andropogon scribnerianus* Nash, N. Y. Bot. Gard. Bul. 1: 432. 1900. Based on *A. elliotii* var. *glaucescens* Scribn.
- Andropogon mississippiensis* Scribn. and Ball, U. S. Dept. Agr., Div. Agrost. Bul. 24: 40. 1901. Biloxi, Miss., *Tracy* 3818.
- Andropogon ternarius* var. *glaucescens* Fern. and Grise., *Rhodora* 37: 137. 1935. Based on *A. elliotii* var. *glaucescens* Scribn.
- (21) *Andropogon tracyi* Nash, N. Y. Bot. Gard. Bul. 1: 433. 1900. Columbus, Miss., *Tracy* 3083.
- (26) *Andropogon virginicus* L., Sp. Pl. 1046. 1753. America. The type specimen bears no data indicating origin. Linnaeus had also a specimen from Gronovius, *Clayton* 460 from Virginia.
- Cinna lateralis* Walt., Fl. Carol. 59. 1788. South Carolina.
- Andropogon dissitiflorus* Michx., Fl. Bor. Amer. 1: 57. 1803. Carolina to Florida, *Michaux*.
- Anatherum virginicum* Spreng., Pl. Pugill. 2: 16. 1815. Based on *Andropogon virginicus* L.
- Andropogon vaginatus* Ell., Bot. S. C. and Ga. 1: 148. 1816. Presumably South Carolina.
- Andropogon tetrastachyus* Ell., Bot. S. C. and Ga. 1: 150. pl. 8. f. 4. 1816. Charleston, S. C.
- Holcus virginicus* Muhl. ex Steud., Nom. Bot. ed. 2. 1: 773. 1840, as synonym of *Andropogon virginicus* L.
- Andropogon eriophorus* Scheele, Flora 27: 51. 1844. Not *A. eriophorus* Willd., 1806. Charles Town, W. Va.
- ? *Andropogon louisianae* Steud., Syn. Pl. Glum. 1: 383. 1854. Louisiana.
- Andropogon curtisianus* Steud., Syn. Pl. Glum. 1: 390. 1854. Carolina, *M. A. Curtis*. Referred by Hackel to *A. virginicus* var. *tetrastachyus*. Description does not well apply to any of our species.
- Andropogon virginicus* var. *vaginatus* Wood, Class-book ed. 1861. 808. 1861. Based on *A. vaginatus* Ell.
- Andropogon virginicus* subsp. *genuinus* Hack. in Mart., Fl. Bras. 2³: 285. 1883. Based on *A. virginicus* L.
- Andropogon virginicus* var. *viridis* Hack. in DC., Monogr. Phan. 6: 410. 1889. Group name for three subvarieties, 1. *genuinus* being *A. virginicus* L.
- Andropogon virginicus* var. *tetrastachyus* Hack. in DC., Monogr. Phan. 6: 411. 1889. Based on *A. tetrastachyus* Ell.
- Sorghum virginicum* Kuntze, Rev. Gén. Pl. 2: 792. 1891. Based on *Andropogon virginicus* L.
- Dimeiosstemon vaginatus* Raf. ex Jacks., Ind. Kew. 1: 760. 1893, as synonym of *Andropogon virginicus* L.
- Dimeiosstemon tetrastachys* Raf. ex Jacks., Ind. Kew. 1: 760. 1893, as synonym of *Andropogon virginicus* L.
- Andropogon virginicus* var. *genuinus* Fern. and Grise., *Rhodora* 37: 142. 1935. Based on *A. virginicus* L.
- ANDROPOGON VIRGINICUS var. GLAUCOPSIS (Ell.) Hitchc., Amer. Jour. Bot. 21: 139. 1934. Based on *A. macrourus* var. *glaucoptis* Ell.
- Andropogon macrourus* var. *glaucoptis* Ell., Bot. S. C. and Ga. 1: 150. 1816. Presumably South Carolina.
- Andropogon glaucoptis* Steud., Nom. Bot. ed. 2. 1: 91. 1840. Not *A. glaucoptis* Steud., 1854. Based on *A. macrourus* var. *glaucoptis* Ell. Published as new by Nash, in Small, Fl. Southeast. U. S. 62. 1903, same basis.
- Andropogon virginicus* var. *dealbatus* Mohr ex Hack., in DC., Monogr. Phan. 6: 411. 1889. Mobile, Ala., *Mohr* [in 1894].
- Andropogon glomeratus* var. *glaucoptis* Mohr, Torrey Bot. Club Bul. 24: 21. 1897. Based on *A. macrourus* var. *glaucoptis* Ell.
- ANDROPOGON VIRGINICUS var. HIRSUTIOR (Hack.) Hitchc., Wash. Acad. Sci. Jour. 23: 456. 1933. Based on *A. macrourus* var. *hirsutior* Hack.
- Andropogon macrourus* var. *hirsutior* Hack. in DC., Monogr. Phan. 6: 409. 1889. Mobile, Ala., *Mohr* [October 28, 1884].
- Andropogon virginicus* var. *viridis* subvar. *ditior* Hack. in DC., Monogr. Phan. 6: 411. 1889. [Jacksonville], Fla., *Curtiss* 3639d.
- Andropogon macrourus* var. *viridis* Curtiss ex Hack. in DC., Monogr. Phan. 6: 411. 1889, as synonym of *A. virginicus* var. *ditior* Hack. Florida, *Curtiss* N. Amer. Pl. 3639d.
- Andropogon macrourus* var. *pumilus* Vasey, Bot. Gaz. 16: 27. 1891. [Seminole Cave, Val Verde County], western Texas, *Nealley* [256 in 1890].
- Andropogon macrourus* var. *viridis* Chapm. ex Vasey, U. S. Natl. Herb. Contrib. 3: 11. 1892. Florida, *Chapman*.
- Andropogon glomeratus* var. *pumilus* Vasey ex L. H. Dewey, U. S. Natl. Herb.

Contrib. 2: 496. 1894. Presumably based on *A. macrourus* var. *pumilus* Vasey.

Andropogon glomeratus var. *hirsutior* Mohr, Torrey Bot. Club Bul. 24: 21. 1897. Based on *A. macrourus* var. *hirsutior* Hack.

Andropogon virginicus var. *tenuispathicus* forma *hirsutior* Fern. and Grise., Rhodora 37: 142. 1935. Based on *A. macrourus* var. *hirsutior* Hack.

- (31) *Andropogon wrightii* Hack., Flora 68: 139. 1885. [Silver City] N. Mex., Wright 2104.

Sorghum wrightii Kuntze, Rev. Gen. Pl. 2: 792. 1891. Based on *Andropogon wrightii* Hack.

Amphilophis wrightii Nash, N. Amer. Fl. 17: 124. 1912. Based on *Andropogon wrightii* Hack.

Bothriochloa wrightii Henr., Blumea 4: 520. 1941. Based on *Andropogon wrightii* Hack.

(127) ANTHAENANTIA Beauv.

- (1) *Anthaenania rufa* (Ell.) Schult., Mantissa 2: 258. 1824. Based on *Aulaxanthus rufus* Ell.

Aulaxanthus rufus Ell., Bot. S. C. and Ga. 1: 103. 1816. South Carolina.

Aulaxia rufa Nutt., Gen. Pl. 1: 47. 1818. Based on *Aulaxanthus rufus* Ell.

Panicum rufum Kunth, Rév. Gram. 1: 35. 1829. Based on *Aulaxanthus rufus* Ell.

Monachne rufa Bertol., Accad. Sci. Bologna Mem. 2: 596. pl. 41. f. 1. 1850. Based on *Panicum rufum* Kunth.

Leptocoryphium drummondii C. Muell., Bot. Ztg. 19: 314. 1861. Louisiana, Drummond.

Panicum ciliatiflorum var. *rufum* Wood, Amer. Bot. and Flor. pt. 2: 392. 1871. [Southern States.]

Panicum aulaxanthus Kuntze, Rev. Gen. Pl. 3²: 361. 1898. Based on *Aulaxanthus rufus* Ell.

Anthaenania rufa scabra Nash in Small, Fl. Southeast. U. S. 79. 1903. South Carolina to Louisiana.

- (2) *Anthaenania villosa* (Michx.) Beauv., Ess. Agrost. 48, 151, pl. 10. f. 7. 1812. Based on *Phalaris villosa* Michx.

Phalaris villosa Michx., Fl. Bor. Amer. 1: 43. 1803. Carolina, Michaux.

Aulaxanthus ciliatus Ell., Bot. S. C. and Ga. 1: 102. 1816. South Carolina.

Panicum erianthum Poir., Encycl. Sup. 4: 284. 1816. Carolina, Bosc.

Panicum hirticalycinum Bosc ex Roem. and Schult., Syst. Veg. 2: 468. 1817, as synonym of *Anthaenania villosa* Beauv.

Aulaxia ciliata Nutt., Gen. Pl. 1: 47. 1818. Based on *Aulaxanthus ciliatus* Ell.

Panicum hirticalycom Bosc ex Spreng.,

Syst. Veg. 1: 315. 1825, as synonym of *P. erianthum* Poir.

Oplismenus erianthos Kunth, Rév. Gram. 1: 45. 1829. Based on *Panicum erianthum* Poir.

Panicum ignoratum Kunth, Rév. Gram. 2: 217. pl. 20. 1830. Based on *Phalaris villosa* Michx.

Leptocoryphium obtusum Steud., Syn. Pl. Glum. 1: 34. 1854. Louisiana, Riehl.

Panicum ciliatiflorum Wood, Class-book pt. 2: 786. 1861. Not *P. ciliatiflorum* Kunth, 1829. Southern States.

Panicum anthaenania Kuntze, Rev. Gen. Pl. 3²: 361. 1898. Based on *Anthaenania villosa* Beauv.

ANTHEPHORA Schreb.

Anthephora hermaphrodita (L.) Kuntze, Rev. Gen. Pl. 2: 759. 1891. Based on *Tripsacum hermaphroditum* L.

Tripsacum hermaphroditum L., Syst. Nat. ed. 10. 2: 1261. 1759. Jamaica.

Anthephora elegans Schreb., Besch. Gräs. 2: 105. pl. 44. 1810. Jamaica.

(117) ANTHOXANTHUM L.

- (2) *Anthoxanthum aristatum* Boiss., Voy. Bot. Esp. 2: 638. 1845. Southern Europe.

Anthoxanthum puelii Lec. and Lam., Cat. Pl. France 385. 1847. France.

Anthoxanthum odoratum var. *puelii* Coss. and Dur., Expl. Sci. Alger. 2: 21. 1854. Based on *A. puelii* Lec. and Lam.

Anthoxanthum odoratum var. *aristatum* Coss. and Dur., Expl. Sci. Alger. 2: 22. 1854-55. Based on *A. aristatum* Boiss.

Anthoxanthum gracile Bivon., Stirp. Rar. Sic. 1: 13. pl. 1. f. 2. 1813. Italy.

- (1) *Anthoxanthum odoratum* L., Sp. Pl. 28. 1753. Europe.

Anthoxanthum odoratum var. *altissimum* Eaton and Wright, Man. Bot. North. States 10. 1817. Probably Connecticut, Ives.

Xanthanathos odoratum St. Lag., Ann. Soc. Bot. Lyon 7: 119. 1880. Based on *Anthoxanthum odoratum* L.

(70) APERA Adans.

- (2) *Apera interrupta* (L.) Beauv., Ess. Agrost. 31, 151. 1812. Based on *Agrostis interrupta* L.

Agrostis interrupta L., Syst. Nat. ed. 10. 2: 872. 1759. Europe.

Anemagrostis interrupta Trin., Fund. Agrost. 129. 1820. Based on *Agrostis interrupta* L.

Muhlenbergia interrupta Steud., Syn. Pl. Glum. 1: 177. 1854. Based on *Agrostis interrupta* L.

Agrostis spica-venti var. *interrupta* Hook. f., Stud. Fl. 432. 1870. Based on *A. interrupta* L.

- Agrostis anemagrostis* subsp. *interrupta* Syme in Sowerby, English Bot. ed. 3. 11: 44. 1873. Based on *A. interrupta* L.
- Apera spica-venti* var. *interrupta* Beal, Grasses N. Amer. 2: 357. 1896. Based on *Agrostis interrupta* L.
- Agrostis interrupta* Bubani, Fl. Pyr. 4: 289. 1901. Based on *Agrostis interrupta* L.
- (1) *Apera spica-venti* (L.) Beauv., Ess. Agrost. 151. 1812. Based on *Agrostis spica-venti* L.
- Agrostis spica-venti* L., Sp. Pl. 61. 1753. Europe.
- Agrostis gracilis* Salisb., Prodr. Stirp. 25. 1796. Based on *A. spica-venti* L.
- Anemagrostis spica-venti* Trin., Fund. Agrost. 129. 1820. Based on *Agrostis spica-venti* L.
- Festuca spica-venti* Raspail, Ann. Sci. Nat., Bot. 5: 445. 1825. Based on *Agrostis spica-venti* L.
- Muhlenbergia spica-venti* Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4: 285. 1841. Based on *Agrostis spica-venti* L.
- Agrostis ventosa* Dulac, Fl. Haut. Pyr. 74. 1867. Based on *Apera spica-venti* Beauv.
- Agrostis anemagrostis* Syme in Sowerby, English Bot. ed. 3. 11: 43. 1873. Based on *Anemagrostis spica-venti* Trin.
- Agrostis anemagrostis* subsp. *spica-venti* Syme in Sowerby, English Bot. ed. 3. 11: 43. 1873. Based on *A. spica-venti* L.
- (92) **ARISTIDA L.**
- (14) *Aristida adscensionis* L., Sp. Pl. 82. 1753. Ascension Island.
- Aristida interrupta* Cav., Icon. Pl. 5: 45. pl. 471. f. 2. 1799. Mexico.
- Chaetaria ascensionis* Beauv., Ess. Agrost. 30, 151, 158. 1812. Based on *A. adscensionis* L.
- Aristida bromoides* H. B. K., Nov. Gen. et Sp. 1: 122. 1815. Ecuador, *Humboldt and Bonpland*.
- Aristida coarctata* H. B. K., Nov. Gen. et Sp. 1: 122. 1815. Mexico, *Humboldt and Bonpland*.
- Chaetaria bromoides* Roem. and Schult., Syst. Veg. 2: 396. 1817. Based on *Aristida bromoides* H. B. K.
- Chaetaria coarctata* Roem. and Schult., Syst. Veg. 2: 396. 1817. Based on *Aristida coarctata* H. B. K.
- Aristida fasciculata* Torr., Ann. Lyc. N. Y. 1: 154. 1824. Canadian River [Texas or Oklahoma], *James*.
- Chaetaria fasciculata* Schult., Mantissa 3 (Add. 1): 578. 1827. Based on *Aristida fasciculata* Torr.
- Aristida nigrescens* Presl, Rel. Haenk. 1: 223. 1830. Mexico, *Haenke*.
- Aristida dispersa* Trin. and Rupr., Acad. St. Pétersb. Mém. VI. Sci. Nat. 5: 129. 1842. Chile.
- Aristida dispersa* var. *bromoides* Trin. and Rupr., Acad. St. Pétersb. Mém. VI. Sci. Nat. 5: 130. 1842. Based on *A. bromoides* H. B. K.
- Aristida dispersa* var. *coarctata* Trin. and Rupr., Acad. St. Pétersb. Mém. VI. Sci. Nat. 5: 130. 1842. Based on *A. coarctata* H. B. K.
- Aristida maritima* Steud., Syn. Pl. Glum. 1: 137. 1854. Guadeloupe.
- Aristida schaffneri* Fourn., Mex. Pl. 2: 78. 1886. Mexico, *Schaffner*.
- Aristida grisebachiana* Fourn., Mex. Pl. 2: 78. 1886. Mexico, *Schaffner* 175 in part, 53.
- Aristida grisebachiana* var. *decolorata* Fourn., Mex. Pl. 2: 78. 1886. Mexico, *Liebmann* 663, 664.
- Aristida adscensionis* var. *coarctata* Kuntze, Rev. Gen. Pl. 3: 340. 1898. Based on *A. coarctata* H. B. K.
- Aristida americana bromoides* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 32: 5. 1901. Based on *A. bromoides* H. B. K.
- Aristida debilis* Mez, Repert. Sp. Nov. Fedde 17: 151. 1921. Venezuela, *Moritz* [638]. [*Moritz* 1522 named *A. debilis* by Mez is different. It has been named *A. moritzii* *Henr.*] Jamaica, *MacNab*.
- Aristida adscensionis* var. *bromoides* *Henr.*, Med. Rijks Herb. Leiden 54: 62. 1926. Based on *A. bromoides* H. B. K.
- Aristida adscensionis* var. *mexicana* Hack. ex *Henr.*, Med. Rijks Herb. Leiden 54A: 265. 1927, as synonym of *A. adscensionis*. Morelia, Mexico, *Arsène*.
- (34) *Aristida affinis* (Schult.) Kunth, Rév. Gram. 1: 61. 1829. Based on *Chaetaria affinis* Schult.
- Aristida racemosa* Muhl., Descr. Gram. 172. 1817. Not *A. racemosa* Spreng., 1807. Presumably Pennsylvania.
- Chaetaria affinis* Schult., Mantissa 2: 210. 1824. Based on *Aristida racemosa* Muhl.
- Aristida purpurascens* var. *alabamensis* Trin. and Rupr., Acad. St. Pétersb. Mém. VI. Sci. Nat. 5: 102. 1842. Alabama.
- Aristida virgata* var. *palustris* Chapm., Fl. South. U. S. 555. 1860. Western Florida.
- Aristida palustris* Vasey, Grasses U. S. Descr. Cat. 35. 1885. Based on *A. virgata* var. *palustris* Chapm.
- (29) *Aristida arizonica* Vasey, Torrey Bot. Club Bul. 13: 27. 1886. Arizona [*Rusby* 875; but the specimen bearing the name and diagnosis in Vasey's script was collected by G. R. Vasey at Las Vegas, N. Mex.].
- (16) *Aristida barbata* Fourn., Mex. Pl. 2: 78. 1886. Valley of Mexico, *Schaffner* 513.
- Aristida havardii* Vasey, Torrey Bot. Club Bul. 13: 27. 1886. Western Texas, *Havard* [28]. The date of publi-

- cation is assumed to be subsequent to that of *A. barbata*.
- (8) *Aristida basiramea* Engelm. ex Vasey, Bot. Gaz. 9: 76. 1884. Minneapolis, Minn., *Upham*.
- (3) *Aristida californica* Thurb. in S. Wats., Bot. Calif. 2: 289. 1880. California, Colorado Desert, *Schott*; Fort Mohave, *Cooper*.
- Aristida jonesii* Vasey, U. S. Natl. Herb. Contrib. 3: 48. 1892, as synonym of *A. californica*. [The Needles, Calif., *Jones* 68a.]
- Aristida californica* var. *fugitiva* Vasey, U. S. Natl. Herb. Contrib. 3: 49. 1892. Colorado Desert, California, *Orcutt* [1486].
- (39) *Aristida condensata* Chapm., Bot. Gaz. 3: 19. 1878. Florida [Apalachicola, *Chapman*].
- Aristida stricta* var. *condensata* Vasey, U. S. Natl. Herb. Contrib. 3: 45. 1892. Based on *A. condensata* Chapm.
- Aristida combsii* Scribn. and Ball, U. S. Dept. Agr., Div. Agrost. Bul. 24: 43. f. 17. 1901. Grasmere, Fla., *Combs* and *Baker* 1069.
- Aristida condensata* var. *combsii* Henr., Med. Rijks Herb. Leiden 54: 108. 1926. Based on *A. combsii* Scribn. and Ball.
- (10) *Aristida curtissii* (A. Gray) Nash in Britton, Man. 94. 1901. Based on *A. dichotoma* var. *curtissii* A. Gray.
- Aristida dichotoma* var. *curtissii* A. Gray, Man. ed. 6. 640. 1890. [Bedford County, Va., *Curtiss*.]
- Aristida basiramea* var. *curtissii* Shinnery, Amer. Midl. Nat. 23: 633. 1940. Based on *A. dichotoma* var. *curtissii* A. Gray.
- (1) *Aristida desmantha* Trin. and Rupr., Acad. St. Pétersb. Mém. VI. Sci. Nat. 51: 109. 1842. Texas, *Drummond* 285 [type], 333.
- (9) *Aristida dichotoma* Michx., Fl. Bor. Amer. 1: 41. 1803. Lincoln, N. C., *Michaux*.
- Curtopogon dichotomus* Beauv., Ess. Agrost. 32, 159. pl. 8. f. 7. 1812. Based on *Aristida dichotoma* Michx.
- Curtopogon dichotomus* Spreng., Syst. Veg. 1: 266. 1825. Based on *Aristida dichotoma* Michx.
- Avena setacea* Muhl. ex Trin., Acad. St. Pétersb. Mém. VI. Math. Phys. Nat. 1: 87. 1830. Not *A. setacea* Vill., 1787. As synonym of *Aristida dichotoma* Michx.
- Avena paradoxa* Willd. ex Kunth, Enum. Pl. 1: 188. 1833, as synonym of *Aristida dichotoma* Michx.
- Aristida dichotoma* forma *major* Shinnery, Amer. Midl. Nat. 23: 634. 1940. Starkville, Miss., *Kearney* in 1896.
- (17) *Aristida divaricata* Humb. and Bonpl. ex Willd., Enum. Pl. 1: 99. 1809. Mexico, *Humboldt* and *Bonpland*.
- Chaetaria divaricata* Beauv., Ess. Agrost. 30, 158. 1812. Based on type of *Aristida divaricata* Humb. and Bonpl.
- Aristida humboldtiana* Trin. and Rupr., Acad. St. Pétersb. Mém. VI. Sci. Nat. 51: 118. 1842. Based on type of *A. divaricata* Humb. and Bonpl.
- Aristida palmeri* Vasey, Torrey Bot. Club Bul. 10: 42. 1883. Southern Arizona, *Palmer*.
- Aristida lemmoni* Scribn., N. Y. Acad. Sci. Trans. 14: 23. 1894. Arizona [Fort Huachuca, *Wilcox*].
- (27) *Aristida fendleriana* Steud., Syn. Pl. Glum. 1: 420. 1855. New Mexico, *Fendler* 973.
- Aristida purpurea* var. *fendleri* Vasey in Rothr., Cat. Pl. Survey W. 100th Merid. 55. 1874. Name only, Denver [Wolf] 1110.
- Aristida purpurea* var. *fendleriana* Vasey, U. S. Natl. Herb. Contrib. 3: 46. 1892. Based on *A. fendleriana* Steud.
- Aristida fasciculata* var. *fendleriana* Vasey ex L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 515. 1894. Based on *A. fendleriana* Steud.
- Aristida longiseta fendleriana* Merr., U. S. Dept. Agr., Div. Agrost. Cir. 34: 5. 1901. Based on *A. fendleriana* Steud.
- Aristida subuniflora* Nash in Small, Fl. Southeast. U. S. 116. 1903. New Mexico, *Vasey*.
- (6) *Aristida floridana* (Chapm.) Vasey, Grasses U. S. Descr. Cat. 35. 1885. Based on *Streptachne floridana* Chapm.
- Streptachne floridana* Chapm., Fl. South. U. S. 554. 1860. South Florida, *Blodgett*.
- Ortachne floridana* Nash in Small, Fl. Southeast. U. S. 119. 1903. Based on *Streptachne floridana* Chapm.
- (4) *Aristida glabrata* (Vasey) Hitchc., U. S. Natl. Herb. Contrib. 22: 522. 1924. Based on *A. californica* var. *glabrata* Vasey.
- Aristida californica* var. *major* Vasey, Calif. Acad. Sci. Proc. II. 2: 212. 1889. Name only [Magdalena Island, *Brandegee* in 1889].
- Aristida californica* var. *glabrata* Vasey, Calif. Acad. Sci. Proc. II. 3: 178. 1891. San José del Cabo, Baja California, [*Brandegee* 34 in 1890].
- (22) *Aristida glauca* (Nees) Walp., Ann. Bot. [London] 1: 925. 1849. Based on *Chaetaria glauca* Nees.
- Chaetaria glauca* Nees, Linnaea 19: 688. 1847. Mexico, *Aschenborn* 251.
- Aristida reverchonii* Vasey, Torrey Bot. Club Bul. 13: 52. 1886. Crockett County, Tex., *Reverchon*.
- Aristida stricta* var. *nealleyi* Vasey, U. S. Natl. Herb. Contrib. 1: 55. 1890. Chenate Mountains, Tex., *Nealley* [709].
- Aristida nealleyi* Vasey, U. S. Natl. Herb. Contrib. 3: 45. 1892. Based on *A.*

- stricta* var. *nealleyi* Vasey.
Aristida reverchonii var. *augusta* [error for *angusta*] Vasey, U. S. Natl. Herb. Contrib. 3: 46. 1892. Comanche Peak, Tex., *Reverchon*.
- Aristida vaseyi* Woot. and Standl., N. Mex. Col. Agr. Bul. 81: 55. 1912. Based on *A. reverchonii* var. *augusta* Vasey.
- (40) *Aristida gyrans* Chapm., Bot. Gaz. 3: 18. 1878. Roberts Key, Caximbas Bay, Fla. [*Chapman*].
- (18) *Aristida hamulosa* Henr., Med. Rijks Herb. Leiden 54: 219. 1926. Tucson, Ariz., *Toumey*.
Aristida humboldtiana var. *minor* Vasey, U. S. Natl. Herb. Contrib. 3: 47. 1892. Texas [*Nealley*].
Aristida imbricata Henr., Med. Rijks Herb. Leiden 54A: 253. 1927. El Paso, Tex., *Griffiths* 7433.
Aristida gentilis var. *breviaristata* Henr., Med. Rijks Herb. Leiden 54A: 255. 1927. Santa Rita Mountains, Ariz., *Griffiths* 7270.
- (15) *Aristida intermedia* Scribn. and Ball, U. S. Dept. Agr., Div. Agrost. Bul. 24: 44. f. 18. 1901. Biloxi, Miss., *Kearney* 204.
- (28) *Aristida lanosa* Muhl. ex Ell., Bot. S. C. and Ga. 1: 143. 1816. South Carolina; name only, Muhl., Cat. Pl. 14. 1813.
Aristida lanata Poir. in Lam., Encycl. Sup. 1: 453. 1810. Not *A. lanata* Forsk., 1775. Carolina, *Bosc*.
Aristida gossypina Bosc ex Beauv., Ess. Agrost. 30, 152. 1812. Name only.
Chaetaria gossypina Bosc ex Beauv., Ess. Agrost. 30, 152, 158. 1812. Name only; Roem. and Schult., Syst. Veg. 2: 391. 1817. Based on *Aristida lanata* Poir.
Aristida lanuginosa Bosc ex Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 2: 46. 1836, name only; Clarion in Trin. and Rupr., Acad. St. Pétersb. Mém. VI. Sci. Nat. 5: 103. 1842. North America, *Bosc*.
Moulinsia lanosa Raf. ex Jacks., Ind. Kew. 2: 267. 1894, as synonym of *Aristida lanosa* Muhl.
Aristida lanosa var. *macera* Fern. and Griseb., Rhodora 37: 135, pl. 335. 1935. Cape Henry, Va., *Fernald* and *Griscom* 2719.
- (13) *Aristida longespica* Poir. in Lam., Encycl. Sup. 1: 452. 1810. Carolina, *Bosc*.
Aristida gracilis Ell., Bot. S. C. and Ga. 1: 142. pl. 8. f. 3. 1816. Charleston, S. C.
Aristida geniculata Raf., Amer. Monthly Mag. 2: 119. 1817. Long Island, N. Y.
Curtopogon gracilis Nees ex Trin. and Rupr., Acad. St. Pétersb. Mém. VI. Sci. Nat. 5: 101. 1842, as synonym of *Aristida gracilis* Ell.
- Aristida gracilis* var. *depauperata* A. Gray, Man. ed. 5. 618. 1867. Philadelphia, *Smith*.
Aristida simplicifolia [error for *simpliciflora*] var. *texana* Vasey, U. S. Natl. Herb. Contrib. 3: 44. 1892. Texas, [*Marshall*, *Riggs* 79].
Trizostis gracilis Raf. ex Jacks., Ind. Kew. 2: 1131. 1895, as synonym of *Aristida gracilis* Ell.
Aristida longespica var. *geniculata* Fernald, Rhodora 35: 318. 1933. Based on *A. geniculata* Raf.
- (26) *Aristida longiseta* Steud., Syn. Pl. Glum. 1: 420. 1855. New Mexico, *Fendler* 978.
Aristida curtiseta Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 92. 1862. Northern Texas [*Buckley*. Spikelets of type aborted by smut]. (Erroneously given in Index Kewensis as *A. breviseta*.)
Aristida purpurea var. *longiseta* Vasey in Rothr., in Wheeler, U. S. Survey W. 100th Merid. Rpt. 6: 286. 1878. Based on *A. longiseta* Steud.
Aristida fasciculata var. *nuttallii* Thurb. ex Beal, Grasses N. Amer. 2: 208. 1896. Based on *A. longiseta* Steud., though Thurber's name probably referred to *A. pallens* as used by Nuttall.
- ARISTIDA LONGISETA VAR. RARIFLORA Hitchc., U. S. Natl. Herb. Contrib. 22: 565. 1924. Tom Green County, Tex., *Tweedy*. (Published as *A. longiseta rariflora*.)
Aristida rariflora Henr., Med. Rijks Herb. Leiden 54A: 314. 1927. Based on *A. longiseta rariflora* Hitchc.
- ARISTIDA LONGISETA VAR. ROBUSTA Merr., U. S. Dept. Agr., Div. Agrost. Cir. 34: 5. 1901. Indian Creek, Mont., *Scribner* 336.
Aristida purpurea robusta Piper, U. S. Natl. Herb. Contrib. 11: 107. 1906. Based on *A. longiseta* var. *robusta* Merr.
- (37) *Aristida mohrii* Nash, N. Y. Bot. Gard. Bul. 1: 436. 1900. Spring Hill, near Mobile, Ala., *Mohr*.
- (11) *Aristida oligantha* Michx., Fl. Bor. Amer. 1: 41. 1803. Illinois, *Michaux*.
? *Aristida adscensionis* [L. misapplied by] Walt., Fl. Carol. 74. 1788. South Carolina.
Chaetaria olygantha Beauv., Ess. Agrost. 30, 158. 1812. Based on *Aristida oligantha* Michx.
Aristida pallens [Cav. misapplied by] Nutt., Gen. Pl. 1: 57. 1818. Fort Mandan, N. Dak. [*Nuttall*].
Aristida micropoda Trin. and Rupr., Acad. St. Pétersb. Mém. VI. Sci. Nat. 5: 107. 1842. Arkansas, *Beyrich*.
Aristida macrochaeta Steud., Syn. Pl. Glum. 1: 134. 1854. Virginia, *M. A. Curtis*.

- Aristida pauciflora* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 92. 1862. Northern Texas [Buckley].
- Aristida oligantha* var. *nervata* Beal, Grasses N. Amer. 2: 202. 1896. Grants Pass, Oreg., Howell.
- (7) *Aristida orcuttiana* Vasey, Torrey Bot. Club Bul. 13: 27. 1886. Hansen's Ranch, Baja California, Orcutt [507].
- Aristida hypomegas* Mez, Repert. Sp. Nov. Fedde 17: 146. 1921. New Mexico, Bigelow [34].
- This species has been referred to *A. schiediana* Trin. and Rupr., a Mexican species not known from the United States.
- (20) *Aristida pansa* Woot. and Standl., U. S. Natl. Herb. Contrib. 16: 112. 1913. Tortugas Mountain, N. Mex., Wooton.
- (33) *Aristida parishii* Hitchc., in Jepson, Fl. Calif. 1: 101. 1912. Agua Caliente, Calif., Parish Brothers 1029a.
- (19) *Aristida patula* Chapm. ex Nash, Torrey Bot. Club Bul. 23: 98. 1896. Based on *A. scabra* as described by Chapman (Fl. South. U. S. ed. 2. 663. 1883), not Kunth, 1829. Florida, Chapman.
- (32) *Aristida purpurascens* Poir. in Lam., Encycl. Sup. 1: 452. 1810. South Carolina, Bosc.
- Chaetaria purpurascens* Beauv., Ess. Agrost. 30, 152, 158. 1812. Based on *Aristida purpurascens* Poir.
- Aristida elliotiana* Steud., Syn. Pl. Glum. 1: 133. 1854. Based on *A. stricta* as described by Elliott, not Michx., 1803.
- Aristida geyeriana* Steud., Syn. Pl. Glum. 1: 133. 1854. Illinois, Geyer.
- Aristida stricta* Steud., Syn. Pl. Glum. 1: 133. 1854. Not *A. stricta* Michx., 1803. As synonym of *A. geyeriana* Steud. Illinois.
- Aristida purpurascens* var. *minor* Vasey, U. S. Natl. Herb. Contrib. 1: 46. 1892. [Horn Island, Miss., Tracy 1564.]
- Aristida purpurascens* var. *glaucescens* Kearney ex Scribn. and Ball, U. S. Dept. Agr., Div. Agrost. Bull. 24: 45. 1901. Biloxi, Miss., Kearney 321.
- (23) *Aristida purpurea* Nutt., Amer. Phil. Soc. Trans. (n. s.) 5: 145. 1837. Red River, Ark. [Nuttall].
- Aristida purpurea* var. *hookeri* Trin. and Rupr., Acad. St. Pétersb. Mém. VI. Sci. Nat. 5: 107. 1842. Texas, Drummond 293.
- Aristida purpurea* var. *berlandieri* Trin. and Rupr., Acad. St. Pétersb. Mém. VI. Sci. Nat. 5: 107. 1842. Bejar [Bexar], Tex., Berlandier 1777.
- Aristida aequiramea* Scheele, Linnaea 22: 343. 1849. New Braunfels, Tex., Lindheimer [562].
- Aristida filipendula* Buckl., Acad. Nat. Sci., Phila. Proc. 1862: 93. 1862. Western Texas [Buckley, the locality being northern Texas].
- Aristida purpurea* var. *californi[c]a* Vasey, U. S. Natl. Herb. Contrib. 3: 47. 1892. California [Capay Valley, Lemmon 5474].
- Aristida fasciculata* var. *californica* Vasey ex L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 515. 1894. Presumably based on *A. purpurea* var. *californica* Vasey.
- Aristida fasciculata* var. *hookeri* L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 515. 1894. Presumably based on *A. purpurea* var. *hookeri* Trin. and Rupr.
- Aristida longiseta hookeri* Merr., U. S. Dept. Agr., Div. Agrost. Cir. 34: 5. 1901. Based on *A. purpurea* var. *hookeri* Trin. and Rupr.
- Aristida purpurea aequiramea* Merr., U. S. Dept. Agr., Div. Agrost. Cir. 34: 7. 1901. Based on *A. aequiramea* Scheele.
- Aristida purpurea capillarifolia* Merr., U. S. Dept. Agr., Div. Agrost. Cir. 34: 8. 1901. Texas, Nealley.
- Aristida berlandieri* Hitchc., U. S. Natl. Herb. Contrib. 17: 280. 1913. Based on *A. purpurea* var. *berlandieri* Trin. and Rupr.
- ARISTIDA PURPUREA VAR. LAXIFLORA Merr., U. S. Dept. Agr., Div. Agrost. Cir. 34: 8. 1901. Texas, Reverchon 12.
- (12) *Aristida ramosissima* Engelm. ex A. Gray, Man. ed. 2. 550. 1856. Illinois, Engelmann [type] and Kentucky.
- Aristida ramosissima* var. *uniaristata* A. Gray, Man. ed. 5. 618. 1867. Odin, Ill., Vasey.
- Aristida ramosissima* var. *chaseana* Henr., Med. Rijks Herb. Leiden. 54B: 498. 1928. Lake Charles, La., Chase 4411.
- (31) *Aristida rhizomophora* Swallen, Wash. Acad. Sci. Jour. 19: 196. f. 1. 1929. North of Lake Okeechobee, Fla., Weatherwax 1081.
- (24) *Aristida roemeriana* Scheele, Linnaea 22: 343. 1849. New Braunfels, Tex., Römer.
- Aristida muhlenbergioides* Fourn., Mex. Pl. 2: 79. 1886. Mexico, Virlet 1424, Karwinsky 1008.
- Aristida purpurea* var. *micrantha* Vasey, U. S. Natl. Herb. Contrib. 3: 47. 1892. Western Texas [Nealley].
- Aristida fasciculata* var. *micrantha* Vasey ex L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 515. 1894. Presumably based on *A. purpurea* var. *micrantha* Vasey.
- Aristida micrantha* Nash in Small, Fl. Southeast. U. S. 117. 1903. Based on *A. purpurea* var. *micrantha* Vasey.
- (36) *Aristida simpliciflora* Chapm., Bot. Gaz. 3: 18. 1878. West Florida [Chapman].
- (21) *Aristida spiciformis* Ell., Bot. S. C. and Ga. 1: 141. 1816. Presumably South Carolina.
- Aristida stricta* Muhl., Descr. Gram. 174.

1817. Not *A. stricta* Michx., 1803. Georgia.
- Aristida squarrosa* Trin. in Spreng., Neu. Entd. 2: 62. 1821. North America.
- Chaetaria squarrosa* Schult., Mantissa 3 (Add. 1): 577. 1827. Based on *Aristida squarrosa* Trin.
- (30) *Aristida stricta* Michx., Fl. Bor. Amer. 1: 41. 1803. South Carolina, *Michaux*. *Chaetaria stricta* Beauv., Ess. Agrost. 30, 152, 158. 1812. Based on *Aristida stricta* Michx.
- Aristida beyrichiana* Trin. and Rupr. Acad. St. Pétersb. Mém. VI. Sci. Nat. 5¹: 104. 1842. Georgia and Arkansas, *Beyrich*.
- (38) *Aristida tenuispica* Hitchc., U. S. Natl. Herb. Contrib. 22: 581. 1924. Hillsboro, Fla., *Combs* 1384.
- (5) *Aristida ternipes* Cav., Icon. Pl. 5: 46. 1799. Panama, *Née*.
- Streptachne scabra* H. B. K., Nov. Gen. et Sp. 1: 124. pl. 40. 1815. Near Toluca, Mex., *Humboldt* and *Bonpland*.
- Streptachne tenuis* H. B. K., Nov. Gen. et Sp. 1: 124. 1815. Venezuela, *Humboldt* and *Bonpland*.
- Aristida scabra* Kunth, Rév. Gram. 1: 62. 1829. Based on *Streptachne scabra* H. B. K.
- Aristida tenuis* Kunth, Rév. Gram. 1: 62. 1829. Based on *Streptachne tenuis* H. B. K.
- Stipa tenuis* Willd. ex Steud., Nom. Bot. ed. 2. 2: 643. 1841, as synonym of *Aristida tenuis*.
- Muhlenbergia scabra* Trin. and Rupr., Acad. St. Pétersb. Mém. VI. Sci. Nat. 5¹: 183. 1842. Based on *Aristida scabra* Kunth.
- Streptachne cubensis* A. Rich. in Sagra, Hist. Cuba 11: 311. 1850. Cuba, *Sagra*.
- Ortachne scabra* Fourn., Soc. Bot. France Bul. 27: 295. 1880. Based on *Streptachne scabra* H. B. K.
- Ortachne tenuis* Fourn., Soc. Bot. France Bul. 27: 295. 1880. Based on *Streptachne tenuis* H. B. K.
- ARISTIDA TERNIPES var. MINOR (Vasey) Hitchc., Wash. Acad. Sci. Jour. 23: 453. 1933. Based on *A. schiedeana* var. *minor* Vasey.
- Aristida schiedeana* var. *minor* Vasey, Torrey Bot. Club Bul. 13: 28. 1886. Arizona, *Pringle* [type]; *Bowie*, *Jones*.
- Aristida divergens* Vasey, U. S. Natl. Herb. Contrib. 3: 48. 1892. Based on *A. schiedeana* var. *minor* Vasey.
- Aristida ternipes divergens* Hitchc., U. S. Natl. Herb. Contrib. 22: 525. 1924. Based on *A. divergens* Vasey.
- (2) *Aristida tuberculosa* Nutt., Gen. Pl. 1: 57. 1818. Near Augusta, Ga.
- Chaetaria tuberculosa* Schult., Mantissa 2: 211. 1824. Based on *Aristida tuberculosa* Nutt.
- (35) *Aristida virgata* Trin. in Spreng., Neu. Entd. 2: 60. 1821. North America [Philadelphia, Pa.].
- Aristida stricta* Steud., Nom. Bot. ed. 2. 1: 132. 1840. Not *A. stricta* Michx., 1803. As synonym of *A. virgata* Trin.
- Aristida perennis* Panz. in Trin. and Rupr., Acad. St. Pétersb. Mém. VI. Sci. Nat. 5¹: 104. 1842. South Carolina. (Fide Henrard, Med. Rijks Herb. Leiden 54A: 439. 1927. (Critical Revis. *Aristida*.)
- Aristida gracilis* var. *virgata* Wood, Amer. Bot. and Flor. pt. 2: 389. 1871. Presumably based on *A. virgata* Trin.
- Aristida purpurascens* var. *depauperata* Vasey ex Beal, Grasses N. Amer. 2: 201. 1896 [Ocean Springs], Miss., *Tracy* [107].
- Aristida chapmaniana* Nash in Small, Fl. Southeast. U. S. 118, 1327. 1903. Apalachicola, Fla., *Chapman*.
- (25) *Aristida wrightii* Nash in Small, Fl. Southeast. U. S. 116. 1903. Dallas, Tex., *Reverchon* 1061.
- (63) ARRHENATHERUM Beauv.
- (1) *Arrhenatherum elatius* (L.) Presl, Fl. Cech. 17. 1819. Based on *Avena elatior* L.
- Avena elatior* L., Sp. Pl. 79. 1753. Europe.
- Holcus avenaceus* Scop., Fl. Carn. ed. 2. 2: 276. 1772. Based on *Avena elatior* L.
- Avena elata* Salisb., Prodr. Stirp. 23. 1796. Not *A. elata* Forsk., 1775. Based on *A. elatior* L.
- Arrhenatherum avenaceum* Beauv., Ess. Agrost. 55, 152, 164. pl. 11. f. 5. 1812. Based on *Holcus avenaceus* Scop.
- Arrhenatherum americanum* Beauv., Ess. Agrost. 56, 152, 1812. Name only.
- Hordeum avenaceum* Wigg. ex Beauv., Ess. Agrost. 165. 1812. Name only, referred to *Arrhenatherum*; Steud., Nom. Bot. 413. 1821, as synonym of *Holcus avenaceus* Scop.
- ARRHENATHERUM ELATIUS var. BIARISTATUM (Peterm.) Peterm., Flora 27: 229. 1844. Based on *A. biaristatum* Peterm.
- Arrhenatherum biaristatum* Peterm., Fl. Lips. 106. 1838. Germany.
- ARRHENATHERUM ELATIUS var. BULBOSUM (Willd.) Spenner, Fl. Friburg. 1: 113. 1825. Based on *Avena bulbosa* Willd.
- Avena tuberosa* Gilib., Exerc. Phyt. 2: 538. 1792. France.
- Avena bulbosa* Willd., Ges. Naturf. Freund. Berlin Neue Schrift. 2: 116. 1799. Switzerland.
- Holcus bulbosus* Schrad., Fl. Germ. 1: 248. 1806. Based on *Avena bulbosa* Willd.
- Holcus avenaceus* var. *bulbosus* Gaudin, Agrost. Helv. 1: 136. 1811. Based on *H. bulbosus* Schrad.
- Avena elatior* var. *bulbosa* St. Amans, Fl.

- Agén. 47. 1821. Based on *A. bulbosa* Willd.
- Arrhenatherum avenaceum* var. *nodosum* Reichenb., Fl. Germ. 1: 53. 1830. Germany.
- Arrhenatherum tuberosum* Schultz, Pollichia 20-21: 272. 1863. Based on *Avena tuberosa* Gilib.
- Avena elatior* var. *tuberosa* Aschers., Fl. Brand. 1: 826. 1864. Based on *A. tuberosa* Gilib.
- Arrhenatherum elatius* var. *tuberosum* Thiel., Soc. Bot. Belg. Bul. 12: 184. 1873. Based on *Avena tuberosa* Gilib.
- Arrhenatherum bulbosum variegatum* Hitchc. in Bailey, Stand. Cycl. Hort. 1: 397. 1914. Cult.
- Arrhenatherum elatius* var. *nodosum* Hubb., Rhodora 18: 234. 1916. Not *A. elatius* var. *nodosum* Parl., 1848. Based on *A. avenaceum* var. *nodosum* Reichenb.
- Arrhenatherum elatius* var. *nodosum* forma *striatum* Hubb., Rhodora 18: 235. 1916. Based on *A. bulbosum variegatum* Hitchc.
- Arrhenatherum elatius* var. *bulbosum* forma *striatum* L. B. Smith, Rhodora 49: 267. 1947. Based on *A. elatius* var. *nodosum* forma *striatum* Hubb.

(153) ARTHRAXON Beauv.

- (1) *Arthraxon hispidus* (Thunb.) Makino, Bot. Mag. [Tokyo] 26: 214. 1912. Based on *Phalaris hispida* Thunb.
- Phalaris hispida* Thunb., Fl. Japon. 44. 1784. Japan.
- ARTHRAxON HISPIDUS var. *CRYPTATHERUS* (Hack.) Honda, Bot. Mag. [Tokyo] 39: 277. 1925. Based on *A. ciliaris* subsp. *langsдорffii* var. *cryptatherus* Hack.
- Arthraxon ciliaris* subsp. *langsдорffii* var. *cryptatherus* Hack., in DC., Monogr. Phan. 6: 355. 1889. Japan.
- Arthraxon cryptatherus* Koidz., Bot. Mag. [Tokyo] 39: 301. 1925. Based on *A. ciliaris* subsp. *langsдорffii* var. *cryptatherus* Hack.

(1) ARUNDINARIA Michx.

- (1) *Arundinaria gigantea* (Walt.) Muhl., Cat. Pl. 14. 1813. Presumably based on *Arundo gigantea* Walt., the name published as "*Arundinaria gigantea* Walt." Carolina, Mississippi. The combination also made by Chapman, Fl. South. U. S. 561. 1860, Walter's name not cited, but *A. macrosperma* Michx. cited as synonym.
- Arundo gigantea* Walt., Fl. Carol. 81. 1788. South Carolina.
- Arundinaria macrosperma* Michx., Fl. Bor. Amer. 1: 74. 1803. Banks of Mississippi, Carolina, Florida, Michaux.
- Miegia macrosperma* Pers., Syn. Pl. 1: 102.

1805. Based on *Arundinaria macrosperma* Michx.
- Ludolfia macrosperma* Willd., Ges. Naturf. Freund. Berlin Mag. 2: 320. 1808. Based on *Arundinaria macrosperma* Michx.
- Miegia gigantea* Nutt., Gen. Pl. 1: 39. 1818. "Alluvions of the Mississippi." Based (through Elliott) on *Arundo gigantea* Walt.
- Arundinaria gigantea* Nutt., Gen. Pl. 1: 39. 1818, as synonym of *Miegia gigantea* Nutt.
- Miegia arundinaria* Raf., West. Rev. Misc. Mag. 1: 93. 1819. Name only. Kentucky.
- Miegia arundinaria* Raf., First Cat. Gard. Bot. Transylv. Univ. 14. 1824. Name only. Kentucky.
- Nastus macrospermus* Raspail, Ann. Sci. Nat., Bot. 5: 442, 458, pl. 8, f. 1. 1825. Based on *Arundinaria macrosperma* Michx.
- Miegia pumila* Nutt., Amer. Phil. Soc. Trans. (n. s.) 5: 149. 1837. Junction of Red and Kiamichi Rivers [Okla.]. A flowering basal shoot.
- Arundinaria tecta* var. *distachya* Rupr., Acad. St. Pétersb. Mém. VI. Sci. Nat. 3¹: 112. pl. 2. f. 1. γ. 1839. "Philadelphia." [Probably received from Philadelphia.]
- Arundinaria tecta* var. *pumila* Rupr., Acad. St. Pétersb. Mém. VI. Sci. Nat. 3¹: 112. 1839. Based on *Miegia pumila* Nutt.
- Arundinaria macrosperma* var. *arborescens* Munro, Linn. Soc. Trans. 26: 15. 1868. Based on *A. macrosperma* Michx.
- Miegia arundinacea* Torr. ex Munro, Linn. Soc. Trans. 26: 15. 1868, as synonym of *Arundinaria macrosperma* var. *arborescens* Munro.
- Bambusa hermanni* E. G. Camus, Bamb. Monogr. 36. 1913, horticultural name as synonym of *Arundinaria macrosperma* Michx.
- (2) *Arundinaria tecta* (Walt.) Muhl., Cat. Pl. 14. 1813; Descr. Gram. 191. 1817. Based on *Arundo tecta* Walt.
- Arundo tecta* Walt., Fl. Carol. 81. 1788. South Carolina.
- Ludolfia tecta* A. Dietr., Sp. Pl. 2: 24. 1833. Based on *Arundo tecta* Walt.
- Festuca grandiflora* Lam., Tabl. Encycl. 1: 191. 1791. "Carolina, Fraser."
- Arundinaria tecta* var. *colorata* Rupr., Acad. St. Pétersb. Mém. VI. Sci. Nat. 3¹: 112. pl. 2. f. 1. δ. 1839. North America.
- Arundinaria macrosperma* var. *suffruticosa* Munro, Linn. Soc. Trans. 26: 15. 1868. Based on *A. tecta* Muhl.
- Arundinaria macrosperma* var. *tecta* Wood, Amer. Bot. and Flor. pt. 2: 404. 1871. Presumably based on *Arundo tecta* Walt. Published as new by Beal,

Grasses N. Amer. 2: 659. 1896, same basis.

Arundinaria gigantea tecta Scribn., Torrey Bot. Club Bul. 20: 478. 1893. Based on *Arundo tecta* Walt.

(26) ARUNDO L.

(1) *Arundo donax* L., Sp. Pl. 81. 1753. Southern Europe.

Arundo sativa Lam., Fl. Franç. 3: 616. 1778. France.

Arundo latifolia Salisb., Prodr. Stirp. 24. 1796. Based on *A. donax* L.

Donax arundinaceus Beauv., Ess. Agrost. 78, 152, 161. 1812. Based on *Arundo donax* L.

Scolochloa arundinacea Mert. and Koch ex Roehl., Deut. Fl. ed. 3. 1²: 530. 1823. Based on *Arundo donax* L.

Cynodon donax Raspail, Ann. Sci. Nat., Bot. 5: 302. 1825. Based on *Arundo donax* L.

Scolochloa donax Gaudin, Fl. Helv. 1: 202. 1828. Based on *Arundo donax* L.

Donax donax Aschers. and Graebn., Fl. Nordostd. Flachl. 101. 1898. Based on *Arundo donax* L.

Arundo glauca Bubani, Fl. Pyr. 4: 303. 1901. Not *A. glauca* Bieb., 1808. Based on *Arundo donax* L.

ARUNDO DONAX var. *versicolor* Stokes, Bot. Mat. Med. 1: 160. 1812. Presumably based on *Arundo versicolor* Mill.

Arundo versicolor Mill., Gard. Dict. ed. 8. No. 3. 1768. Cultivated from India.

Arundo donax var. *variegata* Vilm., Fl. Pl. Terre 90. 1863. France.

(61) AVENA L.

(3) *Avena barbata* Brot., Fl. Lusit. 1: 108. 1804. Europe. [*Avena barbata* Pott. ex Link, Jour. Bot. Schrad. 2: 315. 1799, inadequately described from garden plants and said to be wild about Lisbon, may be the same species.]

Avena brevis Roth, Bot. Abh. 42. 1787. Europe.

Avena byzantina C. Koch, Linnaea 21: 392. 1848. Constantinople.

(1) *Avena fatua* L., Sp. Pl. 80. 1753. Europe.

Avena fatua var. *glabrata* Peterm., Fl. Bienitz 13. 1841. Europe.

Avena nuda L., Amoen. Acad. 3: 401. 1756. Europe.

(2) *Avena sativa* L., Sp. Pl. 79. 1753. Europe.

Avena sativa var. *nigra* Wood, Class-book ed. 2. 610. 1847. Not *A. sativa* var. *nigra* Schrank as to name but probably the same form. Cultivated.

Avena sativa var. *secunda* Wood, Class-book ed. 2. 610. 1847. *A. sativa* var. *secunda* Provancher, Fl. Canad. 2: 689. 1862, is probably the same form. Cultivated.

Avena fatua var. *sativa* Hausskn., Mitt. Geogr. Ges. Thüringen 3: 238. 1885.

Presumably based on *Avena sativa* L.

Avena fatua subsp. *sativa* Thell., Vierteljahrs. Nat. Ges. Zürich 56: 325. 1911. Based on *A. sativa* L.

Avena sterilis L., Sp. Pl. ed. 2. 118. 1762. Spain.

Avena algeriensis Trab., Bul. Agr. Alger. Tunis. 16: 354. 1910. Cult.

Avena sterilis algeriensis Trab., Jour. Hered. 5: 77. 1914. Presumably based on *A. algeriensis* Trab.

Avena strigosa Schreb., Spic. Fl. Lips. 52. 1771. Europe.

(134) AXONOPUS Beauv.

(3) *Axonopus affinis* Chase, Wash. Acad. Sci. Jour. 28: 180. f. 1, 2. 1938. Waynesboro, Miss., Kearney in 1896.

(2) *Axonopus compressus* (Swartz) Beauv., Ess. Agrost. 12. 1812. Based on *Milium compressum* Swartz.

Milium compressum Swartz, Prodr. Veg. Ind. Occ. 24. 1788. Jamaica.

Paspalum tristachyon Lam., Tabl. Encycl. 1: 176. 1791. South America, Richard.

Paspalum platycaulon Poir. in Lam., Encycl. Sup. 5: 34. 1804. Puerto Rico, Ledru.

Agrostis compressa Poir. in Lam., Encycl. Sup. 1: 259. 1810. Not *A. compressa* Poir., op. cit. 258, nor Willd., 1790. Based on *Milium compressum* Swartz.

Paspalum compressum Raspail, Ann. Sci. Nat., Bot. 5: 301. 1825. Based on *Axonopus compressus* Beauv.

Paspalum laticulmum Spreng., Syst. Veg. 1: 245. 1825. West Indies.

Digitaria platycaulis Desv., Opusc. 62. 1831. Based on *Paspalum platycaulon* Poir.

Digitaria domingensis Desv. ex Kunth, Enum. Pl. 1: 49. 1833, as synonym of *Paspalum platycaulon* Poir.

Paspalum platycaule Willd. ex Steud., Nom. Bot. ed. 2. 2: 272. 1840, erroneously cited as synonym of *P. furcatum* Flügge. Ecuador, Humboldt.

Paspalum guadaloupense Steud., Syn. Pl. Glum. 1: 18. 1854. Guadeloupe, Duchassaing.

Paspalum depressum Steud., Syn. Pl. Glum. 1: 20. 1854. Louisiana, Hartmann 51.

Paspalum filostachyum A. Rich. ex Steud., Syn. Pl. Glum. 1: 20. 1854. West Indies, Sieber [365].

Anastrophus compressus Schlecht. ex Doell, in Mart., Fl. Bras. 2²: 102. 1877. Presumably based on *Milium compressum* Swartz.

Paspalum furcatum var. *parviflorum* Doell in Mart., Fl. Bras. 2²: 104. 1877. [West Indies] Sieber 365; [Louisiana], Hartmann 51.

Anastrophus platycaulis Schlecht. ex Jacks., Ind. Kew. 1: 118. 1893, as synonym of *Paspalum platycaulon*.

Panicum platycaulon Kuntze, Rev. Gen. Pl. 3^e: 363. 1898. Based on *Paspalum platycaulon* Poir.

Paspalum raunkiaerii Mez, Repert. Sp. Nov. Fedde 15: 60. 1917. St. Jan, West Indies, *Raunkiaer* 1313.

- (1) *Axonopus furcatus* (Flügge) Hitchc., Rhodora 8: 205. 1906. Based on *Paspalum furcatum* Flügge.

Paspalum furcatum Flügge, Monogr. Pasp. 114. 1810. Carolina, *Bosc*.

Paspalum digitaria C. Muell., Bot. Ztg. 19: 324. 1861. Not *P. digitaria* Poir., 1816. Texas, *Drummond* 276.

Paspalum michauxianum var. *villosum* Vasey, Torrey Bot. Club Bul. 13: 163. 1886. No locality cited. [Type, Orange County, Fla., *Curtiss E.*]

Paspalum furcatum var. *villosum* Vasey, U. S. Natl. Herb. Contrib. 3: 16. 1892. Presumably based on *Paspalum michauxianum* var. *villosum* Vasey.

Paspalum paspaloides var. *villosum* Scribn. and Ball, U. S. Dept. Agr., Div. Agrost. Bul. 24: 42. 1901. Based on *P. furcatum* var. *villosum* Vasey.

Anastrophus furcatus Nash, N. Amer. Fl. 17: 162. 1912. Based on *Paspalum furcatum* Flügge.

This species was called *Paspalum paspaloides* by Scribner (Torrey Bot. Club Mem. 5: 29. 1894) and *Anastrophus paspaloides* by Nash (in Britton, Man. 75. 1901), but *Digitaria paspalodes* Michx., upon which these names are based, is *Paspalum distichum* L.

BAMBUSA Schreb.

Bambusa bambos (L.) Voss in Vilmorin,²¹ Blumengartnerei 1: 1189. 1896. Based on *Arundo bambos* L.

Arundo bambos L., Sp. Pl. 81. 1753. India.

This is the thorny bamboo described by Gamble, Ann. Bot. Gard. Calcutta 7: 51. 1896, under "*Bambusa arundinacea* Willd.," and figured (op. cit. pl. 48) over the name "*Bambusa arundinacea* Retz."

Bambusa multiplex (Lour.) Raeusch., Nomenclature ed. 3. 103. 1797. Name only; Raeusch. ex Schult., Syst. Veg. 7: 1350. 1830. Based on *Arundo multiplex* Lour.

Arundo multiplex Lour. Fl. Cochinch. 58. 1790. Cochinchina.

Bambusa vulgaris Schrad. ex Wendl., Coll. Pl. 2: 26. pl. 47. 1810; (more fully described and illustrated by Gamble, Ann. Bot. Gard. Calcutta 7: 43. pl. 40. 1896). India.

Bambusa thoursii Kunth, Rév. Gram. 2: 323. pl. 73, 74. 1830. Madagascar and Bourbon.

Bambusa surinamensis Rupr., Acad. St. Pétersb. Mém. VI. Sci. Nat. 3^e: 139. pl. 11, f. 49. 1839. Surinam, *Weigelt*.

(106) BECKMANNIA Host

- (1) *Beckmannia syzigachne* (Steud.) Fernald, Rhodora 30: 27. 1928. Based on *Panicum syzigachne* Steud.

Panicum syzigachne Steud., Flora 29: 19. 1846. Japan.

Beckmannia erucaeformis var. *uniflora* Scribn. ex A. Gray, Man. ed. 6. 628. 1890. Iowa to Minnesota and westward.

Beckmannia erucaeformis var. *baicalensis* Kuznezow, Angew. Bot. Bul. 6: 584. 1913. Siberia.

Beckmannia baicalensis Hultén, Svensk. Vet. Akad. Handl. III. 5: 119. 1927. Based on *B. erucaeformis* var. *baicalensis* Kuznezow.

In most American botanical works, until recently, this is referred to *B. erucaeformis* (L.) Host, a European species. Nuttall (Gen. Pl. 1: 48. 1818) misspells the name *Bruchmannia*.

(37) BLEPHARIDACHNE Hack.

- (2) *Blepharidachne bigelovii* (S. Wats.) Hack. in DC., Monogr. Phan. 6: 261. 1889. Based on *Eremochloë bigelovii* S. Wats.

Eremochloë bigelovii S. Wats. in King, Geol. Expl. 40th Par. 5: 382. pl. 40. f. 1-9. 1871. [Frontera, near El Paso, Tex.], *Wright* 2028.

Eremochloë thurberi S. Wats. in King, Geol. Expl. 40th Par. 5: pl. 40. f. 1-9. 1871. Name inadvertently given on the plate illustrating *E. bigelovii*.

- (1) *Blepharidachne kingii* (S. Wats.) Hack. in DC., Monogr. Phan. 6: 261. 1889. Based on *Eremochloë kingii* S. Wats.

Eremochloë kingii S. Wats. in King, Geol. Expl. 40th Par. 5: 382. pl. 40. f. 10-16. 1871. Trinity Mountains, Nev., *Watson*.

(84) BLEPHARONEURON Nash

- (1) *Blepharoneuron tricholepis* (Torr.) Nash, Torrey Bot. Club Bul. 25: 88. 1898. Based on *Vilfa tricholepis* Torr.

Vilfa tricholepis Torr., U. S. Expl. Miss. Pacif. Rpt. 4: 155. 1857. Sandia Mountains, N. Mex. [*Bigelow*].

Sporobolus tricholepis Coulter, Man. Rocky Mount. 411. 1885. Based on *Vilfa tricholepis* Torr.

(112) BOUTELOUA Lag.

- (1) *Bouteloua aristidoides* (H. B. K.) Griseb., Fl. Brit. W. Ind. 537. 1864.

²¹ Contributed by F. A. McClure; see McClure, F. A., Blumea Sup. 3 (Henrard Jubilee vol.): 95. 1946.

- Based on *Dinebra aristidoides* H. B. K.
Dinebra aristidoides H. B. K., Nov. Gen. et Sp. 1: 171. 1816. Mexico, *Humboldt and Bonpland*.
Atheropogon aristidoides Roem. and Schult., Syst. Veg. 2: 415. 1817. Based on *Dinebra aristidoides* H. B. K.
Eutriana aristidoides Trin., Gram. Unifl. 242. 1824. Based on *Atheropogon aristidoides* Roem. and Schult.
Dinebra hirsuta Presl, Rel. Haenk. 1: 292. 1830. Peru, *Haenke*.
Eutriana hirsuta Kunth, Rév. Gram. 1: Sup. 23. 1830. Based on *Dinebra hirsuta* Presl.
Aristida unilateralis Willd. ex Steud., Nom. Bot. ed. 2. 1: 132. 1840, as synonym of *Eutriana aristidoides* Trin.
Bouteloua gracilis "Hook?" ex Vasey in Rothr., in Wheeler, U. S. Survey W 100th Merid. Rpt. 6: 287. 1878. Not *B. gracilis* Lag., 1840. Arizona, *Rothrock* 701.
Bouteloua ciliata Griseb., Abh. Ges. Wiss. Göttingen 24: 302. 1879. Juramento, Argentina, *Lorenz and Hieronymus* 352.
Triathera aristidoides Nash in Small, Fl. Southeast. U. S. 137. 1903. Based on *Dinebra aristidoides* H. B. K.
- BOUTELLOUA ARISTIDOIDES VAR. ARIZONICA Jones, West. Bot. Contrib. 14: 13. 1912. Tucson, Ariz., *Thornber* 177.
- (10) *Bouteloua barbata* Lag., Var. Cienc. 4: 141. 1805. Mexico.
Actinochloa barbata Roem. and Schult., Syst. Veg. 2: 420. 1817. Based on *Bouteloua barbata* Lag.
Eutriana barbata Kunth, Rév. Gram. 1: 96. 1829. Based on *Bouteloua barbata* Lag.
Chondrosium polystachyum Benth., Bot. Voy. Sulph. 56. 1844. Magdalena Bay, Baja California, *Barclay*.
Chondrosium subscorpiodes C. Muell., Bot. Ztg. 14: 347. 1856. Baja California, *Barclay*.
Bouteloua polystachya Torr., U. S. Expl. Miss. Pacif. Rpt. 5²: 366. pl. 10. 1857. Based on *Chondrosium polystachyum* Benth.
Bouteloua pumila Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 93. 1862. Texas, *Wright* 754.
Bouteloua polystachya var. *major* Vasey in Rothr., in Wheeler, U. S. Survey W. 100th Merid. Rpt. 6: 287. 1878. Sonoyta Valley, Ariz., *Rothrock* 691.
Chondrosium exile Fourn., Mex. Pl. 2: 137. 1886. Mexico, *Berlandier* 842.
Chondrosium microstachyum Fourn., Mex. Pl. 2: 138. 1886. Guadalupe, Mexico, *Bourgeau* 667.
Bouteloua arenosa Vasey in S. Wats., Amer. Acad. Sci. Proc. 24: 81. 1889, name only; U. S. Dept. Agr., Div. Bot. Bul. 12¹: pl. 34. 1890. Guaymas, Mexico, *Palmer* 189.
- Bouteloua microstachya* L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 531. 1894. Based on *Chondrosium microstachyum* Fourn.
Bouteloua micrantha Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 32: 8. 1901. Fort Lowell, Ariz., *Griffiths* 1556.
- (16) *Bouteloua breviseta* Vasey, U. S. Natl. Herb. Contrib. 1: 58. 1890. (July 18.) Screw Bean, Presidio County, Tex., *Nealley* [669].
Bouteloua ramosa Scribn. ex Vasey, U. S. Dept. Agr., Div. Bot. Bul. 12¹: pl. 44. 1890. (Oct. 13.) Mexico to Arizona and western Texas, [type, *Nealley*].
Bouteloua oligostachya var. *ramosa* Scribn. ex Beal, Grasses N. Amer. 2: 418. 1896. Based on *B. ramosa* Scribn.
- (6) *Bouteloua chondrosioides* (H. B. K.) Benth. ex S. Wats., Amer. Acad. Sci. Proc. 18: 179. 1883. Based on *Dinebra chondrosioides* H. B. K.
Dinebra chondrosioides H. B. K., Nov. Gen. et Sp. 1: 173. pl. 53. 1816. Michoacán, Mexico, *Humboldt and Bonpland*.
Bouteloua ovata Lag., Gen. et Sp. Nov. 5. 1816. Mexico.
Atheropogon chondrosioides Roem. and Schult., Syst. Veg. 2: 416. 1817. Based on *Dinebra chondrosioides* H. B. K.
Actinochloa ovata Roem. and Schult., Syst. Veg. 2: 420. 1817. Based on *Bouteloua ovata* Lag.
Eutriana cristata Trin., Gram. Unifl. 241. 1824. Based on *Atheropogon chondrosioides* Roem. and Schult.
Chondrosium humboldtianum Kunth, Rév. Gram. 1: 93. 1829. Based on *Dinebra chondrosioides* H. B. K.
Bouteloua havardii Vasey ex S. Wats., Amer. Acad. Sci. Proc. 18: 179. 1883. Limpio Mountains, Tex., *Havard* in 1881.
- (3) *Bouteloua curtispindula* (Michx.) Torr. in Emory, Notes Mil. Recon. 154. 1848. Based on *Chloris curtispindula* Michx.
Chloris curtispindula Michx., Fl. Bor. Amer. 1: 59. 1803. Illinois, *Michaux*.
Bouteloua racemosa Lag., Var. Cienc. 4: 141. 1805. Mexico.
Bouteloua pendula Lag., Var. Cienc. 4: 141. 1805, as synonym of *B. racemosa*.
Atheropogon apludoides Muhl. in Willd., Sp. Pl. 4: 937. 1806. North America.
Bouteloua melicaeformis Brouss. ex Hornem., Enum. Pl. Hort. Hafn. 7. 1807. Name only; Roem. and Schult., Syst. Veg. 2: 414. 1817, as synonym of *Atheropogon apludoides* Muhl.
Bouteloua melicoides Beauv., Ess. Agrost. 40, 155. pl. 9. f. 6. 1812. Based on *B. melicoides* Hornem., doubtless error for *melicaeformis* Brouss.
Dinebra curtispindula Beauv., Ess. Agrost. 98, 158, 160. pl. 16. f. 1. 1812. Pre-

- sumably based on *Chloris curtispindula* Michx.
- Dineba melicoides* Beauv., Ess. Agrost. 160. 1812, name only, probably same as *Bouteloua melicoides* Beauv.
- Cynosurus secundus* Pursh, Fl. Amer. Sept. 2: 728. 1814: "Upper Louisiana" [northern Middle Western States], Bradbury.
- Atheropogon racemosus* Roem. and Schult., Syst. Veg. 2: 414. 1817. Based on *Bouteloua racemosa* Lag.
- Dineba secunda* Roem. and Schult., Syst. Veg. 2: 711. 1817. Based on *Cynosurus secundus* Pursh.
- Aristida secunda* Rud. ex Roem. and Schult., Syst. Veg. 2: 711. 1817, as synonym of *Dineba secunda* Roem. and Schult.
- Eutriana curtispindula* Trin., Fund. Agrost. 161. 1820. Based on *Chloris curtispindula* Michx.
- Melica curtispindula* Michx. ex Steud., Nom. Bot. 1: 91, 519. 1821, as synonym of *Atheropogon apludoides* Muhl.
- Cynodon curtispindula* Raspail, Ann. Sci. Nat., Bot. 5: 303. 1825. Based on *Dineba curtispindula* Beauv.
- Cynodon melicoides* Raspail, Ann. Sci. Nat., Bot. 5: 303. 1825. Based on *Bouteloua melicoides* Beauv.
- Chloris secundus* Eaton, Man. ed. 5. 173. 1829. Based on *Cynosurus secundus* Pursh.
- Andropogon curtispindulus* Spreng. ex Steud., Nom. Bot. ed. 2. 1: 90. 1840, as synonym of *Eutriana curtispindula* Trin.
- Eutriana affinis* Hook. f., Linn. Soc. Trans. 20: 174. 1847. St. Louis, Mo.; Texas, Drummond.
- Heterostegon curtispindula* Schwein. in Hook. f., Linn. Soc. Trans. 20: 175. 1851, as synonym of *Eutriana affinis*.
- Bouteloua curtispindula* var. *aristosa* A. Gray, Man. ed. 2. 553. 1856. Illinois, Geyer.
- Atheropogon curtispindulus* Fourn., Mex. Pl. 2: 138. 1886. Based on *Bouteloua curtispindula* A. Gray [error for Torrey].
- Atheropogon medius* Fourn., Mex. Pl. 2: 139. 1886. Mexico, Liebmann 581.
- Atheropogon affinis* Fourn., Mex. Pl. 2: 141. 1886. Based on *Eutriana affinis* Hook. f.
- Bouteloua racemosa* var. *aristosa* Wats. and Coul. ex Gray, Man. ed. 6. 656. 1890. Illinois, Geyer.
- (5) *Bouteloua eludens* Griffiths, U. S. Natl. Herb. Contrib. 14: 401. 1912. Santa Rita Mountains, Ariz., Griffiths 7269.
- (17) *Bouteloua eriopoda* (Torr.) Torr., U. S. Expl. Miss. Pacif. Rpt. 4: 155. 1856. Based on *Chondrosium eriopodum* Torr.
- Chondrosium eriopodum* Torr. in Emory, Notes Mil. Recon. 154. 1848. Del Norte [Rio Grande] River, N. Mex. [Bigelow].
- Bouteloua brevifolia* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 93. 1862. Northwestern Texas [Wright 748, Fendler 950].
- (8) *Bouteloua filiformis* (Fourn.) Griffiths, U. S. Natl. Herb. Contrib. 14: 413. 1912. Based on *Atheropogon filiformis* Fourn.
- Bouteloua juncifolia* Vasey, Descr. Cat. Grasses U. S. 62. 1885. Name only, Texas [Havard 89] to Arizona. (*B. humboldtiana* Griseb., doubtfully cited, is *B. heterostega* (Trin.) Griffiths of the West Indies.)
- Atheropogon filiformis* Fourn., Mex. Pl. 2: 140. 1886. Mexico, Karwinsky 991b.
- (13) *Bouteloua glandulosa* (Cervant.) Swallen, N. Amer. Fl. 17: 621. 1939. Based on *Erucaria glandulosa* Cervant.
- Erucaria glandulosa* Cervant., Naturaleza 1: 347. 1870. "Guadalupe et Moctezuma," Mexico.
- Bouteloua hirticulmis* Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 30: 4. 1901. Sierra de San Francisquito Mountains, Baja California, Mexico, Brandegee 11.
- (15) *Bouteloua gracilis* (H. B. K.) Lag. ex Steud., Nom. Bot. ed. 2. 1: 219. 1840. Based on *Chondrosium gracile* H. B. K.
- Chondrosium gracile* H. B. K., Nov. Gen. et Sp. 1: 176. pl. 58. 1816. Mexico, Humboldt and Bonpland.
- Actinochloa gracilis* Willd. ex Roem. and Schult., Syst. Veg. 2: 418. 1817. Based on *Chondrosium gracile* H. B. K.
- Atheropogon oligostachyus* Nutt., Gen. Pl. 1: 78. 1818. Plains of the upper Missouri [Nuttall].
- Eutriana gracilis* Trin., Gram. Unifl. 240. 1824. Based on *Actinochloa gracilis* Willd.
- Atheropogon gracilis* Spreng., Syst. Veg. 1: 293. 1825. Based on *Chondrosium gracile* H. B. K.
- Eutriana oligostachya* Kunth, Rév. Gram. 1: 96. 1829. Based on *Atheropogon oligostachyus* Nutt.
- Chondrosium gracile* var. *polystachyum* Nees, Linnaea 19: 692. 1847. Mexico, Aschenborn 153. [Spikes 2 or 3.]
- Chondrosium oligostachyum* Torr. in Marcy, Expl. Red Riv. 300. 1852. Based on *Atheropogon oligostachyum* Nutt.
- Bouteloua oligostachya* Torr. ex A. Gray, Man. ed. 2. 553. 1856. Based on *Atheropogon oligostachyus* Nutt.
- Bouteloua oligostachya* var. *intermedia* Vasey, Grasses U. S. 33. 1883. Name only. Texas to Arizona.
- Bouteloua major* Vasey, Torrey Bot. Club Bul. 14: 9. 1887. Name only, for a plant grown from seed collected in Mexico by Palmer.
- Bouteloua oligostachya* var. *major* Vasey ex

- L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 531. 1894. Texas to Arizona [type, Lemmon 427].
- Bouteloua oligostachya* var. *pallida* Scribn. ex Beal, Grasses N. Amer. 2: 418. 1896. Mexico, Pringle 407.
- BOUTELLOUA GRACILIS** var. **STRICTA** (Vasey) Hitchc., Wash. Acad. Sci. Jour. 23: 454. 1933. Based on *B. stricta* Vasey.
- Bouteloua stricta* Vasey, Torrey Bot. Club Bul. 15: 49. 1888. Western Texas, Nealley, scarcely described; U. S. Dept. Agr., Div. Bot. Bul. 12¹: pl. 45. 1890.
- (14) **Bouteloua hirsuta** Lag., Var. Cienc. 4: 141. 1805. Mexico.
- Bouteloua hirta* Lag., Var. Cienc. 4: 141. 1805, as synonym of *B. hirsuta* Lag.
- Chondrosium hirtum* H. B. K., Nov. Gen. et Sp. 1: 176. pl. 59. 1816. Mexico, Humboldt and Bonpland.
- Actinochloa hirsuta* Roem. and Schult., Syst. Veg. 2: 419. 1817. Based on *Bouteloua hirsuta* Lag.
- Eutriana hirta* Trin., Gram. Unifl. 240. 1824. Based on *Actinochloa hirsuta* Roem. and Schult.
- Atheropogon hirtus* Spreng., Syst. Veg. 1: 293. 1825. Based on *Chondrosium hirtum* H. B. K.
- Chondrosium hirsutum* Sweet, Hort. Brit. 1: 455. 1826. Presumably based on *Actinochloa hirsuta* Roem. and Schult.
- Atheropogon papillosus* Engelm., Amer. Jour. Sci. 46: 104. 1843. Beardstown, Ill., Geyer.
- Chondrosium aschenbornianum* Nees, Linnaea 19: 692. 1847. Mexico, Aschenborn 331.
- Chondrosium foeneum* Torr. in Emory, Notes Mil. Recon. 154. pl. 12. 1848. Valley of the Del Norte [N. Mex., Emory Exped.].
- Chondrosium papillosum* Torr. in Marcy, Expl. Red Riv. 300. 1852. Based on *Atheropogon papillosus* Engelm.
- Bouteloua foenea* Torr. in S. Wats. and Rothr., Cat. Pl. Survey W. 100th Merid. 18. 1874. Based on *Chondrosium foeneum* Torr.
- Bouteloua aschenborniana* Griseb. ex Fourn., Mex. Pl. 2: 137. 1886, as synonym of *Chondrosium aschenbornianum* Nees.
- Chondrosium drummondii* Fourn., Mex. Pl. 2: 137. 1886. Texas, Drummond 323.
- Bouteloua palmeri* Vasey, Torrey Bot. Club Bul. 14: 9. 1887. Name only, later described as *B. hirsuta* var. *palmeri* Vasey ex Beal.
- Bouteloua hirsuta* var. *minor* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 12¹: pl. 39. f. 2. 1890, nomen seminudum. [Texas, Reverchon 1153.]
- Bouteloua hirsuta* var. *major* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 12¹: pl. 39. f. 3. 1890. Without description. [Austin, Tex., Stiles in 1884.]
- Bouteloua hirta* Scribn., U. S. Natl. Herb. Contrib. 2: 531. 1894. Based on *Chondrosium hirtum* H. B. K.
- Bouteloua hirta* var. *major* Vasey ex L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 531. 1894. Western Texas to Mexico.
- Bouteloua hirta* var. *minor* Vasey ex L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 531. 1894. Central Texas.
- Bouteloua hirsuta* var. *palmeri* Vasey ex Beal, Grasses N. Amer. 2: 417. 1896. Cultivated, seed collected by Palmer in Mexico.
- Bouteloua bolanderi* Vasey ex Beal, Grasses N. Amer. 2: 417. 1896, as synonym of *B. hirsuta* var. *palmeri* Vasey.
- Bouteloua pectinata* Featherly, Bot. Gaz. 91: 103. f. 1-4. 1931. Oklahoma, English 71.
- Bouteloua hirsuta* var. *pectinata* Cory, Rhodora 38: 405. 1936. Based on *B. pectinata* Featherly.
- (11) **Bouteloua parryi** (Fourn.) Griffiths, U. S. Natl. Herb. Contrib. 14: 381. 1912. Based on *Chondrosium parryi* Fourn.
- Bouteloua polystachya* var. *vestita* S. Wats., Amer. Acad. Sci. Proc. 18: 177. 1883. Sierra Madre south of Saltillo, Mexico, Palmer 1357 in 1880.
- Chondrosium parryi* Fourn., Mex. Pl. 2: 150. 1886. San Luis Potosí, Parry and Palmer 923½ [error for 943½].
- Bouteloua vestita* Scribn. ex L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 531. 1894. Based on *B. polystachya* var. *vestita* S. Wats.
- (7) **Bouteloua radicata** (Fourn.) Griffiths, U. S. Natl. Herb. Contrib. 14: 411. 1912. Based on *Atheropogon radicosus* Fourn.
- Dinebra bromoides* H. B. K., Nov. Gen. et Sp. 1: 172. pl. 51. 1816. Not *Bouteloua bromoides* Lag., 1816. Mexico, Humboldt and Bonpland.
- Atheropogon bromoides* Roem. and Schult., Syst. Veg. 2: 415. 1817. Based on *Dinebra bromoides* H. B. K.
- Eutriana bromoides* Trin., Fund. Agrost. 161. 1820. Based on *Dinebra bromoides* H. B. K.
- Nestlera festucaeformis* Willd. ex Steud., Nom. Bot. ed. 2. 2: 192. 1841, as synonym of *Eutriana bromoides* Trin.
- Atheropogon radicosus* Fourn., Mex. Pl. 2: 140. 1886. Mexico City, Bourgeau 450.
- Bouteloua bromoides* var. *radicata* Vasey ex L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 533. 1894. Based on *Atheropogon radicosus* Fourn.
- (4) **Bouteloua rigidiseta** (Steud.) Hitchc., Wash. Acad. Sci. Jour. 23: 453. 1933. Based on *Aegopogon rigidisetus* Steud. *Aegopogon rigidisetus* Steud., Syn. Pl.

- Glum. 1: 146. 1854. Texas, *Drummond*.
- Bouteloua texana* S. Wats., Amer. Acad. Sci. Proc. 18: 196. 1883. Texas, *Berlandier* 1535, *Drummond* 340, 374.
- Polyodon texanus* Nash in Small, Fl. Southeast. U. S. 138, 1327. 1903. Based on *Bouteloua texana* S. Wats.
- (12) *Bouteloua rothrockii* Vasey, U. S. Natl. Herb. Contrib. 1: 268. 1893. Cottonwood, Ariz., *Rothrock* 347.
- (9) *Bouteloua simplex* Lag., Var. Cienc. 4: 141. 1805. Peru.
- Chloris procumbens* Durand, Chlor. Sp. 16. 1808. Grown at Madrid, seed said to come from the Philippine Islands (collected by Née) where the species is not known to occur. Probably from South America or Mexico, which regions Née visited.
- Chloris filiformis* Poir. in Lam., Encycl. Sup. 2: 237. 1811. Grown at Paris, the source unknown.
- Chondrosium procumbens* Desv. ex Beauv., Ess. Agrost. 41, 158. pl. 9. f. 7. 1812. Based on *Chloris procumbens* Durand.
- Chondrosium humile* Beauv., Ess. Agrost. 41, 158. 1812. Name only.
- Chondrosium tenue* Beauv., Ess. Agrost. 41, 158. 1812. Name only.
- Atheropogon procumbens* Jacq., Eclog. Gram. 2: 16. pl. 12. 1813. Based on *Chloris procumbens* Durand.
- Bouteloua prostrata* Lag., Gen. et Sp. Nov. 5. 1816. Mexico.
- Chondrosium humile* H. B. K., Nov. Gen. et Sp. 1: 175. pl. 56. 1816. Ecuador, *Humboldt* and *Bonpland*.
- Chondrosium tenue* Beauv. ex H. B. K., Nov. Gen. et Sp. 1: 176. pl. 57. 1816. Mexico, *Humboldt* and *Bonpland*.
- Chloris tenuis* Poir. in Lam., Encycl. Sup. 5: 614. 1817. Based on *C. filiformis* Poir., p. 237, not *C. filiformis* Poir., op. cit. p. 238.
- Actinochloa procumbens* Roem. and Schult., Syst. Veg. 2: 417. 1817. Based on *Chloris procumbens* Durand.
- Actinochloa humilis* Willd. ex Roem. and Schult., Syst. Veg. 2: 417. 1817. Based on *Chondrosium humile* H. B. K.
- Actinochloa simplex* Roem. and Schult., Syst. Veg. 2: 418. 1817. Based on *Bouteloua simplex* Lag.
- Actinochloa tenuis* Willd. ex Roem. and Schult., Syst. Veg. 2: 418. 1817. Based on *Chondrosium tenue* H. B. K.
- Actinochloa prostrata* Roem. and Schult., Syst. Veg. 2: 419. 1817. Based on *Bouteloua prostrata* Lag.
- Eutriana humilis* Trin., Gram. Unifl. 239. 1824. Based on *Actinochloa humilis* Willd.
- Eutriana tenuis* Trin., Gram. Unifl. 240. 1824. Based on *Actinochloa tenuis* Willd.
- Atheropogon humilis* Spreng., Syst. Veg. 1: 293. 1825. Based on *Chondrosium humile* H. B. K.
- Cynodon procumbens* Raspail, Ann. Sci. Nat., Bot. 5: 303. 1825. Based on *Chondrosium procumbens* Desv.
- Chondrosium prostratum* Sweet, Hort. Brit. 1: 455. 1826. Based on *Bouteloua prostrata* Lag.
- Chondrosium simplex* Kunth, Rév. Gram. 1: 94. 1829. Based on *Bouteloua simplex* Lag.
- Bouteloua tenuis* Griseb., Abh. Ges. Wiss. Göttingen 19: 259. 1874. Based on *Chondrosium tenue* Beauv.
- Bouteloua humilis* Hieron., Bol. Acad. Cienc. Córdoba 4: 495. 1882. Based on *Chondrosium humile* Beauv.
- Bouteloua pusilla* Vasey, Torrey Bot. Club Bul. 11: 6. 1884. Kingman, N. Mex., Vasey.
- Bouteloua brachyathera* Phil., An. Mus. Nac. Chile Bot. 8: 85. 1891. Tarapacá, Chile.
- Bouteloua rahmeri* Phil., An. Mus. Nac. Chile Bot. 8: 85. 1891. Tarapacá, Chile.
- Bouteloua procumbens* Griffiths, U. S. Natl. Herb. Contrib. 14: 364. 1912. Based on *Chloris procumbens* Durand.
- Bouteloua simplex* var. *rahmeri* Henr., Med. Rijks Herb. Leiden No. 40: 66. 1921. Based on *B. rahmeri* Phil.
- (18) *Bouteloua trifida* Thurb. in S. Wats., Amer. Acad. Sci. Proc. 18: 177. 1883. Monclova, Coahuila, *Palmer* 1355 in 1880.
- Bouteloua burkii* Scribn. in S. Wats., Amer. Acad. Sci. Proc. 18: 179. 1883. Western Texas and New Mexico, *Berlandier* 167 and 1427.
- Chondrosium trinii* Fourn., Mex. Pl. 2: 136. 1886. Laredo, Tex., *Berlandier* 1427.
- Chondrosium polystachyum* Trin. ex Fourn., Mex. Pl. 2: 136. 1886, as synonym of *C. trinii* Fourn.
- Chondrosium virletii* Fourn., Mex. Pl. 2: 136. 1886. San Luis Potosí, Mexico. *Virlet* 1373.
- Bouteloua trifida* var. *burkii* Vasey ex L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 532. 1894. Based on *B. burkii* Scribn.
- Bouteloua trinii* Griffiths, U. S. Natl. Herb. Contrib. 14: 387. 1912. Based on *Chondrosium trinii* Fourn. Griffiths accepts 1881 as the date for Fournier's work.
- (2) *Bouteloua uniflora* Vasey, Bot. Gaz. 16: 26. 1891. Crockett County, Tex., *Nealley* [222].
- (133) **BRACHIARIA** (Trin.) Griseb.
- (1) *Brachiaria ciliatissima* (Buckl.) Chase in Hitchc., U. S. Dept. Agr. Bul. 772: 221. 1920. Based on *Panicum ciliatissimum* Buckl.

- Panicum ciliatissimum* Buckl., Tex. Geol. Agr. Survey Prel. Rpt. App. 4. 1866. Northern Texas [Buckley].
- Brachiaria erucaeformis** (J. E. Smith) Griseb. in Ledeb., Fl. Ross. 4: 469. 1853. Based on *Panicum erucaeforme* J. E. Smith.
- Panicum erucaeforme* J. E. Smith in Sibth., Fl. Graec. 1: 44. pl. 59. 1806. Greece.
- Panicum isachne* Roth in Roem. and Schult., Syst. Veg. 2: 458. 1819. East Indies.
- Echinochloa eruciformis* Koch, Linnaea 21: 437. 1848. Based on *Panicum erucaeforme* J. E. Smith.
- Panicum isachne* var. *mexicana* Beal, Grasses N. Amer. 2: 114. 1896. Grown from seed said to come from Mexico.
- Brachiaria isachne* Stapf in Prain, Fl. Trop. Afr. 9: 552. 1917. Based on *Panicum isachne* Roth.
- (3) **Brachiaria plantaginea** (Link) Hitchc., U. S. Natl. Herb. Contrib. 12: 212. 1909. Based on *Panicum plantagineum* Link.
- Panicum plantagineum* Link, Hort. Berol. 1: 206. 1827. Grown in Berlin, origin unknown.
- Panicum leandri* Trin., Gram. Icon. 3: pl. 335. 1836. Brazil.
- Panicum distans* Salzm. ex Steud., Syn. Pl. Glum. 1: 61. 1854. Not *P. distans* Trin., 1829. Bahia, Brazil [Salzmann].
- Panicum disciferum* Fourn., Mex. Pl. 2: 19. 1886. San Luis Potosí, Mexico, Virlet 1292.
- (2) **Brachiaria platyphylla** (Griseb.) Nash in Small, Fl. Southeast. U. S. 81. 1927. 1903. Based on *Paspalum platyphyllum* Griseb.
- Paspalum platyphyllum* Griseb., Pl. Cub. Cat. 230. 1866. Not *P. platyphyllum* Schult., 1827. Zarabanda, Cuba, Wright 3441.
- Panicum platyphyllum* Munro ex Wright, An. Acad. Cienc. Habana 8: 206. 1871. Based on *Paspalum platyphyllum* Griseb.
- Brachiaria extensa* Chase, U. S. Natl. Herb. Contrib. 28: 240. 1929. Based on *Paspalum platyphyllum* Griseb. Not *P. platyphyllum* Schult.
- Brachiaria subquadrifera** (Trin.) Hitchc., Lingnan Sci. Jour. 7: 214. 1931. Based on *Panicum subquadrifera* Trin.
- Panicum subquadrifera* Trin., Gram. Pan. 145. 1826. Marianas Islands.
- (87) **BRACHYELYTRUM** Beauv.
- (1) **Brachyelytrum erectum** (Schreb.) Beauv., Ess. Agrost. 155. 1812. Based on *Muhlenbergia erecta* Schreb.
- Muhlenbergia erecta* Schreb. in Roth, Neue Beyträge Bot. 1: 97. 1802. "America boreali." It is stated (p. 96) that a fuller description will be furnished by Schreber in a new part of his Beschreibung der Gräser, which, however, did not appear until 1810. (Beschreib. Gräs. 2: 139. pl. 50. 1810.) Name only, Muhl., Amer. Phil. Soc. Trans. 3: 160. 1793.
- Dilepyrum aristosum* Michx., Fl. Bor. Amer. 1: 40. 1803. Georgia and Carolina, Michaux.
- Muhlenbergia aristata* Pers., Syn. Pl. 1: 73. 1805. Based on *Dilepyrum aristosum* Michx.
- Brachyelytrum aristatum* Roem. and Schult., Syst. Veg. 2: 413. 1817. Based on *Dilepyrum aristosum* Michx.
- Muhlenbergia brachyelytrum* Trin., Gram. Unifl. 188. 1824. Based on *Brachyelytrum erectum* Beauv.
- Agrostis erecta* Spreng., Syst. Veg. 1: 264. 1825. Based on *Muhlenbergia erecta* Schreb.
- Brachyelytrum aristatum* var. *engelmanni* A. Gray, Man. ed. 5. 614. 1867. "A western form."
- Brachyelytrum aristosum* Trel., Brann. and Coville, in Branner, Ark. Geol. Survey Rpt. 4: 235. 1891. Based on *Dilepyrum aristosum* Michx.
- Brachyelytrum aristosum* var. *glabratum* Vasey in Millsp., W. Va. Agr. Expt. Sta. Bul. 24: 469. 1892. Fayette near Nuttallburg, W. Va., Nuttall.
- Dilepyrum erectum* Farwell, Amer. Midl. Nat. 8: 33. 1922. Based on *Muhlenbergia erecta* Schreb.
- Brachyelytrum erectum* var. *septentrionale* Babel, Rhodora 45: 260. 1943. Durham, N. H., Babel 46.
- (3) **BRACHYPODIUM** Beauv.
- Brachypodium caespitosum** (Host) Roem. and Schult., Syst. Veg. 2: 737. 1817. Based on *Bromus caespitosus* Host.
- Bromus caespitosus* Host, Icon. Gram. Austr. 4: 11. pl. 18. 1809. Tyrol. (Spelled "cespitosus.")
- (1) **Brachypodium distachyon** (L.) Beauv., Ess. Agrost. 101, 155. 1812. Based on *Bromus distachyos* L.
- Bromus distachyos* L., Cent. Pl. 2: 8. 1756; Amoen. Acad. 4: 304. 1759. Europe and the Orient.
- Festuca distachyos* Roth, Cat. Bot. Fasc. 1: 11. 1797. Based on *Bromus distachyos* L.
- Trachynia distachya* Link, Hort. Berol. 1: 43. 1827. Based on *Bromus distachyos* L.
- Zerna distachyos* Panz. ex Jacks., Ind. Kew. 2: 1249. 1895. Based on *Festuca distachyos* Roth.
- Brachypodium pinnatum** (L.) Beauv., Ess. Agrost. 101, 155. pl. 19. f. 3. 1812. Based on *Bromus pinnatus* L.
- Bromus pinnatus* L. Sp. Pl. 78. 1753. Europe.
- Brachypodium sylvaticum** (Huds.) Beauv., Ess. Agrost. 101, 155. 1810. Based

ultimately on *Festuca sylvatica* Huds.
Festuca sylvatica Huds., Fl. Angl. 1: 38.
 1762. England.

(13) BRIZA L.

- (1) *Briza maxima* L., Sp. Pl. 70. 1753. Europe.
- (3) *Briza media* L., Sp. Pl. 70. 1753. Europe.
- (2) *Briza minor* L., Sp. Pl. 70. 1753. Europe.

(2) BROMUS L.

- (3) *Bromus aleutensis* Trin. ex Griseb., in Ledeb., Fl. Ross. 4: 361. 1853. Unalaska, *Eschscholz*.
- Bromus alopecuroides* Poir., Voy. Barb. 2: 100. 1789. Algeria, *Poiret*.
- Bromus contortus* Desf., Fl. Atlant. 1: 95. pl. 25. 1800. Algeria.
- Bromus alopecuroides* Pers., Syn. Pl. 1: 95. 1805. "*B. contortus* Desf." and "*Poiret, iter*" [Voyage Barbarie] both cited.
- (24) *Bromus anomalus* Rupr. ex Fourn., Acad. Sci. Brux. Bul. 9²: 236. 1840. Name only; Mex. Pl. 2: 126. 1886. Mexico, *Galeotti* 5757, 5815.
- Bromus kalmii* var. *porteri* Coult., Man. Rocky Mount. 425. 1885. Twin Lakes, Colo., *Porter*.
- Bromus ciliatus* var. *minor* Munro ex L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 548. 1894. West Texas [Chisos Mountains, *Havard* 20].
- Bromus ciliatus porteri* Rydb., U. S. Natl. Herb. Contrib. 3: 192. 1895. Based on *B. kalmii* var. *porteri* Coult.
- Bromus porteri* Nash, Torrey Bot. Club Bul. 22: 512. 1895. Based on *B. kalmii* var. *porteri* Coult.
- Bromus ciliatus* var. *montanus* Vasey ex Beal, Grasses N. Amer. 2: 619. 1896. Colorado, *Patterson* 264.
- Bromus kalmii* var. *occidentalis* Vasey ex Beal, Grasses N. Amer. 2: 624. 1896. Montana [type, *Canby* and *Scribner* 384].
- Bromus scabratus* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 13: 46. 1898. Not *B. scabratus* Link, 1843. Vermilion Creek, Wyo., *A. Nelson* 3800.
- Bromus kalmii* var. *major* Vasey ex Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 35. 1900, as synonym of *B. porteri* Nash.
- Bromus porteri havardii* Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 37. 1900. Based on *B. ciliatus* var. *minor* Munro.
- Zerna anomala* Henr., Blumea 4: 499. 1941. Based on *Bromus anomalus* Rupr.
- BROMUS ANOMALUS VAR. LANATIPES (Shear) Hitchc., Wash. Acad. Sci. Jour. 23: 449. 1933. Based on *B. porteri* var. *lanatipes* Shear.
- Bromus porteri* var. *lanatipes* Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 37

- 1900. Idaho Springs, Colo., *Shear* 739.
- Bromus lanatipes* Rydb., Colo. Agr. Expt. Sta. Bul. 100: 52. 1906. Based on *B. porteri* var. *lanatipes* Shear.
- (36) *Bromus arenarius* Labill., Nov. Holl. Pl. 1: 23. pl. 28. 1804. Australia.
- (6) *Bromus arizonicus* (Shear) Stebbins, Calif. Acad. Sci. IV. Proc. 25: 309. 1944. Based on *Bromus carinatus* var. *arizonicus* Shear.
- Bromus carinatus* var. *arizonicus* Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 62. 1900. Santa Cruz Valley, Tucson, Ariz., *Pringle* in 1884.
- (35) *Bromus arvensis* L., Sp. Pl. 77. 1753. Europe.
- Bromus erectus* var. *arvensis* Huds., Fl. Angl. ed. 2. 50. 1778. Based on *B. arvensis* L.
- Serrafalcus arvensis* Godr., Fl. Lorr. 3: 185. 1844. Based on *Bromus arvensis* L.
- Forasaccus arvensis* Bubani, Fl. Pyr. 4: 385. 1901. Based on *Bromus arvensis* L.
- (4) *Bromus breviaristatus* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 98. 1862. Rocky Mountains, *Nuttall*.
- Bromus parviflorus* Nutt. ex A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 336. 1862, as synonym of *B. breviaristatus* Buckl.
- Bromus subvelutinus* Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 52. 1900. Reno, Nev., *Tracy* 249.
- Bromus pauciflorus* Nutt. ex Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 53. 1900. This name, on Nuttall's ticket on the type of *B. breviaristatus* Buckl., was misread as "*parviflorus*" by Gray.
- Bromus carinatus* var. *linearis* Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 61. 1900. California, *Vasey* in 1875.
- (27) *Bromus brizaeformis* Fisch. and Mey., Ind. Sem. Hort. Petrop. 3: 30. 1837. Europe.
- (5) *Bromus carinatus* Hook. and Arn., Bot., Beechey Voy. 403. 1840. California.
- Ceratochloa grandiflora* Hook., Fl. Bor. Amer. 2: 253. 1840. Not *Bromus grandiflorus* Weigel, 1772. Plains of the Columbia [Oregon], *Scouler*, *Douglas*.
- Bromus oregonus* Nutt. ex Hook. f., Jour. Bot. Kew Misc. 8: 18. 1856. Name only for *Geyer* 244, "Upper Missouri and Oregon territories." Nutt. ex Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 59. 1900, as synonym of *B. carinatus*.
- Bromus virens* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 98. 1862. Rocky Mountains and Columbia River, *Nuttall*. The specimen in the herbarium of the Philadelphia Academy is the Pacific coast form with long awns, and probably came from the Columbia River.
- Bromus californicus* Nutt. ex Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 336.

- 1862, as synonym of *B. virens* Buckl. [California, Nuttall.]
- Bromus nitens* Nutt. ex A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 336. 1862, as synonym of *B. virens* Buckl. [Columbia woods, Nuttall.]
- Bromus hookerianus* Thurb. in Wilkes, U. S. Expl. Exped. Bot. 17: 493. 1874. Based on *Ceratochloa grandiflora* Hook.
- Bromus hookerianus* var. *minor* Scribn. ex Vasey, Deser. Cat. Grasses U. S. 92. 1885, name only, Oregon; Macoun, Cat. Can. Pl. 24: 238. 1888, without description, *B. virens* Buckl., cited as synonym.
- Bromus virens* var. *minor* Scribn. in Beal, Grasses N. Amer. 2: 614. 1896. Arizona and Oregon.
- Bromus carinatus californicus* Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 60. 1900. [California, Nuttall.]
- Bromus carinatus hookerianus* Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 60. 1900. Based on *B. hookerianus* Thurb.
- Bromus carinatus* var. *densus* Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 61. 1900. San Nicolas Island, Calif., Trask [12].
- (1) *Bromus catharticus* Vahl, Symb. Bot. 2: 22. 1791. Lima, Peru.
- Festuca unioides* Willd., Hort. Berol. 3. pl. 3. 1803. Described from a plant grown at Berlin from seed from "Carolina," where it must have been cultivated.
- Ceratochloa unioides* Beauv., Ess. Agrost. 75. pl. 15. f. 7. 1812. Based on *Festuca unioides* Willd.
- Bromus unioides* H. B. K., Nov. Gen. et Sp., 1: 151. 1815. Quito, Ecuador, Humboldt and Bonpland.
- Schedonorus unioides* Roem. and Schult., Syst. Veg. 2: 708. 1817. Based on *Bromus unioides* H. B. K.
- Bromus unioides* Raspail, Ann. Sci. Nat., Bot. 5: 439. 1825. Based on *Ceratochloa unioides* Beauv.
- Bromus willdenovii* Kunth, Rév. Gram. 1: 134. 1829. Based on *Festuca unioides* Willd.
- Ceratochloa pendula* Schrad., Linnaea 6: Litt. 72. 1831. Grown at Göttingen from seed from Carolina.
- Bromus schraderi* Kunth, Enum. Pl. 1: 416. 1833. Based on *Ceratochloa pendula* Schrad.
- Bromus mucronatus* Willd. ex Steud., Nom. Bot. ed. 2. 1: 228. 1840, as synonym of *B. unioides* H. B. K.
- Ceratochloa breviaristata* Hook., Fl. Bor. Amer. 2: 253. pl. 234. 1840. Lewis and Clark River and near the sources of the Columbia. Douglas [in 1826].
- Bromus breviaristatus* Thurb. in Wilkes, U. S. Expl. Exped. Bot. 172: 493. 1874. Not *B. breviaristatus* Buckl., 1862. Based on *Ceratochloa breviaristata* Hook.
- Tragus unioides* Panz. ex Jacks., Ind. Kew. 2: 1099. 1895, as synonym of *Festuca unioides* Willd.
- Forasaccus breviaristatus* [error for *breviaristatus*] Lunell, Amer. Midl. Nat. 4: 225. 1915. Based on *Ceratochloa breviaristata* Hook.
- Zerna unioides* Lindm., Svensk Fanerogamfl. 101. 1918. Based on *Bromus unioides* H. B. K.
- Ceratochloa cathartica* Herter, Rev. Sudamer. Bot. 6: 144. 1940. Based on *Bromus catharticus* Vahl.
- The form described by Shear (U. S. Dept. Agr., Div. Agrost. Bul. 23: 52. 1900) as *Bromus unioides haenkeanus* (Presl) Shear is a form of rescue grass, but *Ceratochloa haenkeana* Presl, upon which the name is based, is a different species with purplish, awned spikelets, as shown by examination of the type, from Chile, at the herbarium of the German University at Prague.
- (19) *Bromus ciliatus* L., Sp. Pl. 1: 76. 1753. Grown at Uppsala from seed collected by Kalm in Canada.
- Bromus canadensis* Michx., Fl. Bor. Amer. 1: 65. 1803. Canada, Lac St. Jean, Michaux.
- Bromus richardsoni* Link, Hort. Berol. 2: 281. 1833. Grown at Berlin from seed sent by Richardson from northwestern North America.
- Bromus purgans* var. *longispicatus* Hook., Fl. Bor. Amer. 2: 252. 1840. Rocky Mountains, Drummond.
- Bromus purgans* var. *pallidus* Hook., Fl. Bor. Amer. 2: 252. 1840. Saskatchewan to Rocky Mountains, Drummond.
- Bromus inermis* var. *ciliatus* Traut., Act. Hort. Petrop. 5: 135. 1877. Based on *B. ciliatus* L.
- Bromus hookeri* var. *canadensis* Fourn., Mex. Pl. 2: 128. 1886. Based on *B. canadensis* Michx.
- Bromus hookeri* var. *ciliatus* Fourn., Mex. Pl. 2: 128. 1886. Based on *B. ciliatus* L.
- Bromus ciliatus scariosus* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 13: 46. 1898. Sheep Mountain, Wyo., A. Nelson 3305.
- Bromus richardsoni* var. *pallidus* Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 34. 1900. Based on *B. purgans* var. *pallidus* Hook.
- Forasaccus ciliatus* Lunell, Amer. Midl. Nat. 4: 225. 1915. Based on *Bromus ciliatus* L.
- Bromus ciliatus* forma *denudatus* Wiegand, Rhodora 24: 91. 1922. Ashfield, Mass., Williams in 1909.
- Bromus ciliatus* var. *denudatus* Fernald, Rhodora 28: 20. 1926. Based on *B. ciliatus* forma *denudatus* Wiegand.
- Bromus dudleyi* Fernald, Rhodora 32: 63. pl. 196. f. 1-3. 1930. Deer Brook, Bonne Bay, Newfoundland, Fernald, Long, and Fogg 1223.

Bromus ciliatus var. *intonsus* Fernald, *Rhodora* 32: 70. 1930. Ashfield, Mass., Williams, August 4, 1909. The form with more densely pilose sheaths. According to Fernald (*Rhodora* 32: 70. 1930) this, as shown by specimens so named in the Gray Herbarium, is the form described as *B. asper* Murray in Gray's Manual, eds. 5 and 6, and in Britton and Brown's Illustrated Flora. Shear in his revision of *Bromus* (U. S. Dept. Agr., Div. Agrost. Bul. 23: 30. 1900) uses the earlier name *B. ramosus* Huds., but says he had seen no American specimens.

Zerna richardsoni Nevski, Act. Univ. Asiae Med. VIII b. Bot. 17: 17. 1934. Based on *Bromus richardsoni* Link.

Zerna ciliata Henr., *Blumea* 4: 498. 1941. Based on *Bromus ciliatus* L.

(29) *Bromus commutatus* Schrad., *Fl. Germ.* 353. 1806. Germany.

Bromus pratensis Ehrh., *Beiträge* 6: 84. 1791. Name only; Hoffm. *Deut. Fl.* ed. 2. 2: 52. 1800. Not *B. pratensis* Lam., 1785. Europe.

Brachypodium commutatum Beauv., *Ess. Agrost.* 101, 155. 1812. Based on *Bromus commutatus* Lam. (error for Schrad.).

Serrafalcus commutatus Bab., *Man. Brit. Bot.* ed. 1. 374. 1843. Based on *Bromus commutatus* Schrad.

Bromus mutabilis var. *commutatus* Schultz, *Flora* 32: 234. 1849. Based on *B. commutatus* Schrad.

Bromus racemosus var. *commutatus* Coss. and Dur., *Expl. Sci. Alger.* 2: 165. 1855. Based on *B. commutatus* Schrad.

Bromus mollis var. *commutatus* Sanio, *Verh. Bot. Ver. Brand.* 23: Abh. 31. 1882. Based on *B. commutatus* Schrad.

Serrafalcus racemosus var. *commutatus* Husnot, *Gram. Fr. Belg.* 72. 1899. Based on *Bromus commutatus* Schrad.

Forasaccus commutatus Bubani, *Fl. Pyr.* 4: 387. 1901. Based on *Bromus commutatus* Schrad.

Bromus secalinus var. *gladewitzii* Farwell, *Amer. Midl. Nat.* 10: 24. 1926. Michigan, Farwell and Gladewitz 7434.

BROMUS COMMUTATUS var. *APRICORUM* Simonkai, *Enum.*, *Fl. Transsilv.* 583. 1886. Europe.

(12) *Bromus erectus* Huds., *Fl. Angl.* 39. 1762. England.

Festuca erecta Wallr., *Sched. Crit.* 35. 1822. Based on *Bromus erectus* Smith (error for Huds.).

Bromus macounii Vasey, *Torrey Bot. Club Bul.* 15: 48. 1888. Vancouver Island, Macoun in 1887.

Zerna erecta Panz. ex Jacks., *Ind. Kew.* 2: 1249. 1895. Based on *Bromus erectus* Huds.

Forasaccus erectus Bubani, *Fl. Pyr.* 4: 384. 1901. Based on *Bromus erectus* Huds.

(26) *Bromus frondosus* (Shear) Woot. and

Standl., *N. Mex. Col. Agr. Bul.* 81: 144. 1912. Based on *B. porteri* var. *frondosus* Shear.

Bromus porteri var. *frondosus* Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 37. 1900. Mangas, N. Mex., J. G. Smith in 1897.

(15) *Bromus grandis* (Shear) Hitchc. in Jepson, *Fl. Calif.* 1: 175. 1912. Based on *B. orcuttianus* var. *grandis* Shear.

Bromus orcuttianus var. *grandis* Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 43. 1900. San Diego, Calif., Orcutt 472.

Bromus porteri var. *assimilis* Davy, *Calif. Univ. Pubs.*, Bot. 1: 55. 1902. San Jacinto Mountains, Hall 2228.

(10) *Bromus inermis* Leyss., *Fl. Hal.* 16. 1761. Europe.

Festuca inermis DC. and Lam., *Fl. Franc.* 3: 49. 1805. Based on *Bromus inermis* Leyss.

Schedonorus inermis Beauv., *Ess. Agrost.* 99, 177. 1812. Based on *Festuca inermis* DC.

Festuca inermis var. *villosa* Mert. and Koch, *Deutschl. Fl.* 1: 675. 1823. Germany.

Bromus inermis var. *aristatus* Schur, *Enum. Pl. Transsilv.* 805. 1866. Europe.

Bromus inopinatus Brues, *Trans. Wis. Acad. Sci., Arts, and Letters* 17: 73. 1911. Milwaukee, Wis. [Brues 78].

Forasaccus inermis Lunell, *Amer. Midl. Nat.* 4: 225. 1915. Based on *Bromus inermis* Leyss.

Zerna inermis Lindm., *Svensk Fanerogamfl.* 101. 1918. Based on *Bromus inermis* Leyss.

Bromus inermis forma *villosus* Fernald, *Rhodora* 35: 316. 1933. Based on *Festuca inermis* var. *villosa* Mert. and Koch.

Bromus inermis forma *aristatus* Fernald, *Rhodora* 35: 316. 1933. Based on *B. inermis* var. *aristatus* Schur.

Bromus inermis forma *bulbiferus* Moore, *Rhodora* 43: 76. 1941. Ramsey County, Minn., Kaufman in 1938.

(34) *Bromus japonicus* Thunb., *Fl. Japon.* 52. 1784. Japan.

Bromus patulus Mert. and Koch, *Deut. Fl.* 1: 685. 1823. Europe.

Bromus arvensis var. *patulus* Mutel, *Fl. Franç.* 4: 134. 1837. Based on *B. patulus* Mert. and Koch.

Serrafalcus patulus Parl., *Fl. Ital.* 1: 394. 1848. Based on *Bromus patulus* Mert. and Koch.

Bromus squarrosus var. *patulus* Regel, *Act. Hort. Petrop.* 7: 602. 1881. Based on *B. patulus* Mert. and Koch.

Forasaccus patulus Bubani, *Fl. Pyr.* 4: 387. 1901. Based on *Bromus patulus* Mert. and Koch.

Bromus japonicus var. *porrectus* Hack.

- Magyar Bot. Lapok (Ungar. Bot. Bl.) 2: 58. 1903. Eurasia.
- Bromus japonicus* var. *subsquarrosus* (Borb.) Savul. and Rays., (Rumania) Min. Agr. Bul. 4 (Sup. 2): 39. 1924. As synonym of *B. japonicus* var. *porrectus* Hack.
- (25) *Bromus kalmii* A. Gray, Man. 600. 1848. Canada or northeastern United States, *Kalm*.
- Bromus laciniatus* Beal, Grasses N. Amer. 2: 615. 1896. Mexico.
- Bromus pendulinus* Sessé ex Lag., Gen. and Sp. Nov. 4. 1816. Not *B. pendulinus* Schrad. 1810. Mexico.
- (17) *Bromus laevipes* Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 45. 1900. West Klickitat County, Wash., *Suksdorf* 178.
- (21) *Bromus latiglumis* (Shear) Hitchc., *Rhodora* 8: 211. 1906. Based on *B. purgans* var. *latiglumis* Shear.
- Bromus altissimus* Pursh, Fl. Amer. Sept. 2: 728. 1814. Not *B. altissimus* Gilib., 1790. On the banks of the Missouri [*Nuttall*].
- Bromus purgans* var. *latiglumis* Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 40. 1900. Dakota City, Iowa, *Pammel* 222.
- Bromus ciliatus latiglumis* Scribn. ex Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 40. 1900, as synonym of *B. purgans* var. *latiglumis* Shear.
- Bromus purgans* var. *incanus* Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 41. 1900. Canton, Ill., *Wolf* 3.
- Bromus incanus* Hitchc., *Rhodora* 8: 212. 1906. Based on *B. purgans* var. *incanus* Shear.
- Forasaccus latiglumis* Lunell, Amer. Midl. Nat. 4: 225. 1915. Based on *Bromus latiglumis* Hitchc.
- Bromus ciliatus* var. *incanus* Farwell, Amer. Midl. Nat. 10: 204. 1927. Based on *B. purgans* var. *incanus* Shear.
- Bromus ciliatus* var. *incanus* subvar. *latiglumis* Farwell, Amer. Midl. Nat. 10: 204. 1927. Based on *B. purgans* var. *latiglumis* Shear.
- Bromus latiglumis* forma *incanus* Fernald, *Rhodora* 35: 316. 1933. Based on *B. purgans* var. *incanus* Shear.
- Zerna latiglumis* Henr., *Blumea* 4: 498. 1941. Based on *Bromus purgans* var. *latiglumis* Shear.
- Bromus macrostachys* Desf., Fl. Atlant. 1: 96. pl. 19. f. 2. 1798. Algeria.
- Serrafalcus macrostachys* Parl., Fl. Ital. 1: 397. 1848. Based on *Bromus macrostachys* Desf.
- Zerna macrostachys* Panz. ex Jacks., Ind. Kew. 2: 1249. 1895. Based on *Bromus macrostachys* Desf.
- (40) *Bromus madritensis* L., Cent. Pl. 1: 5. 1755; *Amoen. Acad.* 4: 265. 1759. Spain. (The name is spelled *matritensis* in Roem. and Schult., Syst. Veg. 2: 651. 1817.)
- Festuca madritensis* Desf., Fl. Atlant. 1: 91. 1798. Based on *Bromus madritensis* L.
- Zerna madritensis* Panz. ex Jacks., Ind. Kew. 2: 1249. 1895, as synonym of *Bromus madritensis* L.
- Anisantha madritensis* Nevski, Act. Univ. Asiae Med. VIII b. Bot. 17: 21. 1934. Based on *Bromus madritensis* L.
- (7) *Bromus marginatus* Nees in Steud., Syn. Pl. Glum. 1: 322. 1854. Columbia River, *Douglas*.
- Bromus hookeri* var. *marginatus* Fourn., Mex. Pl. 2: 127. 1886. Based on *B. marginatus* Nees. [*B. hookeri* Fourn. (not *B. hookerianus* Thurb.) is based on "*B. purgans* Hook. f., Bot. of Capt. Beech. Voy. 119," name only.]
- Ceratochloa marginata* Nees ex Steud. ex Jacks., Ind. Kew. 1: 487. 1893, presumably referring to *Bromus marginatus* Nees.
- Bromus marginatus* var. *seminudus* Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 55. 1900. Wallowa Lake, Oreg., *Shear* 1811.
- Bromus marginatus* var. *latior* Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 55. 1900. Walla Walla, Wash., *Shear* 1615.
- Bromus flodmanii* Rydb., Torrey Bot. Club Bul. 36: 538. 1909. Sheep Creek, Mont., *Flodman* 187.
- Forasaccus marginatus* Lunell, Amer. Midl. Nat. 4: 225. 1915. Based on *Bromus marginatus* Nees.
- Bromus latior* Rydb., Fl. Rocky Mount. 89. 1917. Based on *B. marginatus* var. *latior* Shear.
- (8) *Bromus maritimus* (Piper) Hitchc. in Jepson, Fl. Calif. 1: 177. 1912. Based on *B. marginatus maritimus* Piper.
- Bromus marginatus maritimus* Piper, Biol. Soc. Wash. Proc. 18: 148. 1905. Point Reyes, Calif., *Davy* 6798.
- (31) *Bromus molliformis* Lloyd, Fl. Loire-Inf. 315. 1844. France.
- (30) *Bromus mollis* L., Sp. Pl. ed. 2. 1: 112. 1762. Europe.
- Serrafalcus mollis* Parl., Pl. Rar. Sic. 2: 11. 1840. Based on *Bromus mollis* L.
- Forasaccus mollis* Bubani, Fl. Pyr. 4: 386. 1901. Based on *Bromus mollis* L.
- Bromus hordeaceus* L. subsp. *mollis* Hylander, Uppsala Univ. Årskr: 7: 84. 1945. Based on *B. mollis* L.
- This is the species referred to *B. hordeaceus* L. in recent American works. The specimen referred by Shear (U. S. Dept. Agr., Div. Agrost. Bul. 23: 19. 1900) to *B. hordeaceus* var. *intermedius* (Guss.) Shear belongs to *B. mollis*.
- (22) *Bromus nottowayanus* Fernald, *Rhodora* 43: 530. pl. 670. f. 1-7. 1941. Sussex County, Va., *Fernald* and *Long* 12239.

14. *Bromus orcuttianus* Vasey, Bot. Gaz. 10: 223. 1885. San Diego, Calif., *Orcutt* in 1884.
Bromus brachyphyllus Merr., Rhodora 4: 146. 1902. Crook County Oreg., *Cusick* 2677.
- BROMUS ORCUTTIANUS* var. *HALLII* Hitchc. in Jepson, Fl. Calif. 1: 175. 1912. San Jacinto Mountains, *Hall* 2301.
- (16) *Bromus pacificus* Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 38. 1900. Seaside, Oreg., *Scribner* and *Shear* 1703.
Bromus magnificus Elmer, Bot. Gaz. 36: 53. 1903. Port Angeles, Wash., *Elmer* 1957.
- (9) *Bromus polyanthus* Scribn. in Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 56. 1900. Based on *B. multiflorus* Scribn.
Bromus multiflorus Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 13: 46. 1898. Not *B. multiflorus* Weigel, 1772. Battle Lake, Wyo., *A. Nelson* 4021.
Bromus polyanthus var. *paniculatus* Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 57. 1900. West Mancos Canyon, Colo., *Tracy*, *Earle*, and *Baker* 333.
Bromus paniculatus Rydb., Fl. Rocky Mount. 90. 1917. Based on *B. polyanthus* var. *paniculatus* Shear.
- (11) *Bromus pumpellianus* Scribn., Torrey Bot. Club Bul. 15: 9. 1888. Belt Mountains, Mont., *Scribner* 418.
Bromus purgans var. *purpurascens* Hook., Fl. Bor. Amer. 2: 252. 1840. Bear Lake to Arctic seacoast, *Richardson*.
Bromus ciliatus var. *coloradensis* Vasey, Torrey Bot. Club Bul. 15: 10. 1888, name only; *Beal*, Grasses N. Amer. 2: 619. 1896. [Colo. Expl. 100th Merid. *Wolf* 1158.]
Bromus pumpellianus var. *melicoides* Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 50. 1900. Beaver Creek Camp, Colo., *Pammel* in 1896.
Forasaccus pumpellianus Lunell, Amer. Midl. Nat. 4: 225. 1915. Based on *Bromus pumpellianus* Scribn.
- BROMUS PUMPELLIANUS* var. *TWEEDYI* Scribn. in *Beal*, Grasses N. Amer. 2: 622. 1896. Yellowstone Park, *Tweedy* 587.
- (20) *Bromus purgans* L., Sp. Pl. 1: 76. 1753. Canada, *Kalm*.
Bromus pubescens Muhl. in Willd., Enum. Pl. 120. 1809. Pennsylvania, *Muhlenberg*.
Bromus imperialis Steud., Nom. Bot. ed. 2. 1: 229. 1840, as synonym of *B. purgans* L.
Bromus steudelii Frank ex Steud., Nom. Bot. ed. 2. 1: 229. 1840, as synonym of *B. purgans* L.
Bromus ciliatus var. *purgans* A. Gray, Man. 600. 1848. Based on *B. purgans* L.
Bromus hookeri var. *pubescens* Fourn.,
- Mex. Pl. 2: 127. 1886. Based on *B. pubescens* Muhl.
- Forasaccus purgans* Lunell, Amer. Midl. Nat. 4: 225. 1915. Based on *Bromus purgans* L.
Bromus purgans forma *laevivaginat* Wiegand, Rhodora 24: 92. 1922. Ithaca, N. Y., *Metcalf* 5821.
Bromus ciliatus var. *purgans* subvar. *laevivaginat* Farwell, Amer. Midl. Nat. 10: 204. 1927. Presumably based on *B. purgans* forma *laevivaginat* Wiegand.
Zerna purgans Henr., Blumea 4: 498. 1941. Based on *Bromus purgans* L.
- BROMUS PURGANS* var. *LAEVIGLUMIS* (Scribn.) Swallen, Biol. Soc. Wash. Proc. 54: 45. 1941. Based on *B. ciliatus* var. *laeviglumis* Scribn.
Bromus ciliatus var. *laeviglumis* Scribn. in Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 32. 1900. Galt, Ontario, *Herriot* in 1898.
Forasaccus ciliatus var. *laeviglumis* Lunell, Amer. Midl. Nat. 4: 225. 1915. Based on *Bromus ciliatus* var. *laeviglumis* Scribn.
Bromus purgans forma *glabriflorus* Wiegand, Rhodora 24: 92. 1922. Ithaca, N. Y., *Metcalf* 5813.
Bromus laeviglumis Hitchc., Biol. Soc. Wash. Proc. 41: 157. 1928. Based on *B. ciliatus* var. *laeviglumis* Scribn.
- (32) *Bromus racemosus* L., Sp. Pl. ed. 2. 1: 114. 1762. Europe.
Bromus mollis var. *lelostachys* Hartm., Skand. Fl. Handb. ed. 2: 33. 1832. Sweden.
Serrafalcus racemosus Parl., Rar. Pl. Sic. 2: 14. 1840. Based on *Bromus racemosus* L.
Bromus arvensis var. *racemosus* Neilreich, Fl. Nieder-Oesterr. 81. 1859. Based on *B. racemosus* L.
Bromus squarrosus var. *racemosus* Regel, Act. Hort. Petrop. 7: 602. 1881. Based on *B. racemosus* L.
Forasaccus racemosus Bubani, Fl. Pyr. 4: 387. 1901. Based on *Bromus racemosus* L.
Bromus mollis forma *lelostachys* Fernald, Rhodora 35: 316. 1933. Based on *B. mollis* var. *lelostachys* Hartm.
- The specimens referred by Shear (U. S. Dept. Agr., Div. Agrost. Bul. 23: 20. 1900) to *B. hordeaceus* var. *glabrescens* (Coss.) Shear belong to *B. racemosus*.
- Bromus ramosus* Huds., Fl. Angl. 40. 1762. England.
Zerna ramosa Lindm., Svensk. Fanerogamfl. 101. 1918. Based on *Bromus ramosus* Huds.
- (37) *Bromus rigidus* Roth, Mag. Bot. Roem. and Ust. 10: 21. 1790. Europe.
Bromus villosus Forsk., Fl. Aegypt. Arab. 23. 1775. Not *B. villosus* Scop., 1772. Egypt.

- Bromus maximus* Desf., Fl. Atlant. 1: 95. pl. 26. 1798. Not *B. maximus* Gilib., 1790. North Africa.
- Bromus madritensis* var. *maximus* St. Amans, Fl. Agen. 45. 1821. Based on *B. maximus* Desf.
- Bromus rubens* var. *rigidus* Mutel, Fl. Franç. 4: 133. 1837. Based on *B. rigidus* Roth.
- Bromus madritensis* var. *rigidus* Bab. ex Syme in Sowerby, English Bot. ed. 3. 11: 161. 1873. Based on *B. rigidus* Roth.
- Bromus villosus* var. *maximus* Aschers. and Graebn., Syn. Mitteleur. Fl. 2: 595. 1901. Based on *B. maximus* Desf.
- Bromus villosus* var. *rigidus* Aschers. and Graebn., Syn. Mitteleur. Fl. 2: 596. 1901. Based on *B. rigidus* Roth.
- Forasaccus maximus* Bubani, Fl. Pyr. 4: 382. 1901. Based on *Bromus maximus* Desf.
- Anisantha rigida* Hylander, Uppsala Univ. Årskr. 7: 32. 1945. Based on *Bromus rigidus* Roth.
- BROMUS RIGIDUS** var. **GUSSONEI** (Parl.) Coss. and Dur., Expl. Sci. Alger. 2: 159. 1855. Based on *B. gussonii* Parl.
- Bromus gussonii* Parl., Rar. Pl. Sic. 2: 8. 1840. Europe.
- Bromus maximus* var. *gussonii* Parl., Fl. Ital. 1: 407. 1848. Based on *B. gussonii* Parl.
- Bromus villosus* var. *gussonii* Aschers. and Graebn., Syn. Mitteleur. Fl. 2: 595. 1901. Based on *B. gussonii* Parl.
- Zerna gussonii* Grossh., Akad. Nauk. S. S. R. Bot. Inst. Trudy Azerbaidzh. Fil. 8: 305. 1939. Based on *Bromus gussonii* Parl.
- (39) **Bromus rubens** L., Cent. Pl. 1: 5. 1755; Amoen. Acad. 4: 265. 1759. Spain.
- Festuca rubens* Pers., Syn. Pl. 1: 94. 1805. Based on *Bromus rubens* L.
- Bromus scoparius* var. *rubens* St. Amans, Fl. Agen. 45. 1821. Based on *B. rubens* L.
- Bromus madritensis* subsp. *rubens* Husnot, Gram. Fr. Belg. 71. 1899. Based on *B. rubens* L.
- Anisantha rubens* Nevski, Act. Univ. Asiae Med. VIII b. Bot. 17: 19. 1934. Based on *Bromus rubens* L.
- Zerna rubens* Grossh., Akad. Nauk S. S. R. Bot. Inst. Trudy Azerbaidzh. Fil. 8: 306. 1939. Based on *Bromus rubens* L.
- Bromus scoparius** L., Cent. Pl. 1: 6. 1755; Amoen. Acad. 4: 266. 1759. Spain.
- Serrafalcus scoparius* Parl., Fl. Palerm. 1: 174. 1845. Based on *Bromus scoparius* L.
- (28) **Bromus secalinus** L., Sp. Pl. 76. 1753. Europe.
- Bromus mollis* var. *secalinus* Huds., Fl. Angl. ed. 2. 49. 1778. Based on *B. secalinus* L.
- Avena secalinus* Salisb., Prodr. Stirp. 22. 1796. Based on *Bromus secalinus* L.
- Serrafalcus secalinus* Bab., Man. Brit. Bot. ed. 1. 374. 1843. Based on *Bromus secalinus* L.
- ?*Bromus submuticus* Steud., Syn. Pl. Glum. 1: 321. 1854. St. Louis, Mo.
- Forasaccus secalinus* Bubani, Fl. Pyr. 4: 388. 1901. Based on *Bromus secalinus* L.
- BROMUS SECALINUS** var. **VELUTINUS** Koch, Syn. Fl. Germ. Helv. 819. 1837. Based on *B. velutinus* Schrad.
- Bromus velutinus* Schrad., Fl. Germ. 1: 349. pl. 6. f. 3. 1806. Germany.
- (2) **Bromus sitchensis** Trin., Acad. St. Pétersb. Mém. VI. Math. Phys. Nat. 2: 173. 1832. Sitka, Alaska [Mertens].
- (33) **Bromus squarrosus** L., Sp. Pl. 1: 76. 1753. France, Switzerland, Siberia.
- (38) **Bromus sterilis** L., Sp. Pl. 77. 1753. Europe.
- Schedonorus sterilis* Fries, Bot. Not. 131. 1843. Based on *Bromus sterilis* L.
- Zerna sterilis* Panz. ex Jacks., Ind. Kew. 2: 1249. 1895, as synonym of *Bromus sterilis* L.
- Anisantha sterilis* Nevski, Act. Univ. Asiae Med. VIII b. Bot. 17: 20. 1934. Based on *Bromus sterilis* L.
- (13) **Bromus suksdorfii** Vasey, Bot. Gaz. 10: 23. 1885. Mount Adams, Wash., Suksdorf [74 in 1883].
- (41) **Bromus tectorum** L., Sp. Pl. 77. 1753. Europe.
- Schedonorus tectorum* Fries, Bot. Not. 131. 1843. Based on *Bromus tectorum* L.
- Bromus setaceus* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 98. 1862. Northern Texas, Buckley.
- Zerna tectorum* Panz. ex Jacks., Ind. Kew. 2: 1249. 1895, as synonym of *Bromus tectorum* L.
- BROMUS TECTORUM** var. **GLABRATUS** Spenner, Fl. Friburg. 1: 152. 1825. Germany.
- Bromus tectorum* var. *nudus* Klett. and Richt., Fl. Leipzig 109. 1830. Germany.
- Anisantha tectorum* Nevski, Act. Univ. Asiae Med. VIII b. Bot. 17: 20. 1934. Based on *Bromus tectorum* L.
- Bromus tectorum* forma *nudus* St. John, Fl. Southeast. Wash. and Adj. Idaho 36. 1937. Based on *B. tectorum* var. *nudus* Klett. and Richt.
- (23) **Bromus texensis** (Shear) Hitchc., U. S. Natl. Herb. Contrib. 17: 381. 1913. Based on *B. purgans* var. *texensis* Shear.
- Bromus purgans* var. *texensis* Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 41. 1900. Bexar County, Tex., Jerny 230.
- (42) **Bromus trinii** Desv. in Gay, Fl. Chil. 6: 441. 1853. Based on *Trisetum hirtum* Trin.
- Trisetum hirtum* Trin., Linnaea 10: 300. 1836. Not *Bromus hirtus* Lichtst., 1817. Chile.

- Bromus trinii* var. *pallidiflorus* Desv. in Gay, Fl. Chil. 6: 441. 1853. Chile.
- Trisetum barbatum* Steud., Syn. Pl. Glum. 1: 229. 1854. Not *T. barbatum* Nees, 1841. Chile, *Bertero* 806.
- Danthonia pseudo-spicata* C. Muell., Bot. Ztg. 14: 348. 1856. Valparaiso, Chile, *Cuming* 466.
- Trisetum barbatum* var. *major* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 13: 60. 1893. Mexico, *Palmer* 667.
- Bromus barbatooides* Beal, Grasses N. Amer. 2: 614. 1896. Based on *Trisetum barbatum* Steud.
- Bromus barbatooides* var. *sulcatus* Beal, Grasses N. Amer. 2: 615. 1896. Mexico, *Palmer* 667.
- Trisetum trinii* Louis-Marie, Rhodora 30: 243. 1928. Based on *Bromus trinii* Desv.
- Trisetum trinii* var. *pallidiflorus* Louis-Marie, Rhodora 30: 243. 1928. Based on *Bromus trinii* var. *pallidiflorus* Desv.
- Trisetum trinii* var. *majus* Louis-Marie, Rhodora 30: 243. 1928. Based on *T. barbatum* var. *major* Vasey.
- Trisetobromus hirtus* Nevski, Acta Univ. Asiae Med. VIII b. Bot. 17: 15. 1934. Based on *Trisetum hirtum* Trin.
- BROMUS TRINII** var. **EXCELSUS** Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 25. 1900. Panamint Mountains, Calif., *Coville* and *Funston* 522.
- (18) **Bromus vulgaris** (Hook.) Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 43. 1900. Based on *B. purgans* var. *vulgaris* Hook.
- Bromus purgans* var. *vulgaris* Hook., Fl. Bor. Amer. 2: 252. 1840. Canada, *Goldie*, *Richardson*; Red River, *Douglas*; Columbia River, *Scouler*.
- Bromus ciliatus* var. *ligulatus* Vasey ex Macoun, Can. Pl. Cat. 2: 238. 1888. Name only, Vancouver Island, *Macoun* in 1887.
- Bromus ciliatus* var. *pauciflorus* Vasey ex Macoun, Can. Pl. Cat. 2: 238. 1888, name only; Beal, Grasses N. Amer. 2: 619. 1896. Oregon, *Howell*.
- Bromus debilis* Nutt. ex Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 43. 1900, as synonym of *B. vulgaris*. [Columbia River, *Scouler*.]
- Bromus vulgaris* var. *eximius* Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 44. 1900. Near Wallowa Lake, Oreg., *Shear* 1791.
- Bromus vulgaris* var. *robustus* Shear, U. S. Dept. Agr., Div. Agrost. Bul. 23: 44. 1900. Seaside, Oreg., *Shear* 1710.
- Bromus ciliatus* var. *glaberrimus* Suksdorf, Deut. Bot. Monatsschr. 19: 93. 1901. Skamania County, Wash., *Suksdorf* in 1894 [2335].
- Bromus eximius* Piper, U. S. Natl. Herb. Contrib. 11: 143. 1906. Based on *B. vulgaris* var. *eximius* Shear.
- Bromus eximius robustus* Piper, U. S. Natl. Herb. Contrib. 11: 143. 1906. Based on *B. vulgaris* var. *robustus* Shear.
- Bromus eximius umbraticus* Piper, U. S. Natl. Herb. Contrib. 11: 144. 1906. Based on *Bromus vulgaris* Shear, not *Bromus purgans* var. *vulgaris* Hook., Piper considering the specimens referred by Shear to this species to be distinct from the form described by Hooker.
- Zerna vulgaris* Henr., Blumea 4: 498. 1941. Based on *Bromus purgans* var. *vulgaris* Hook.

(115) BUCHLOË Engelm.

- (1) **Buchloë dactyloides** (Nutt.) Engelm., Acad. Sci. St. Louis, Trans. 1: 432. pl. 12, 14, f. 1-17. 1859. Based on *Sesleria dactyloides* Nutt.
- Sesleria dactyloides* Nutt., Gen. Pl. 1: 65. 1818. Grassy plains of the Missouri [Nuttall, type a staminate plant].
- Antheophora axilliflora* Steud., Syn. Pl. Glum. 1: 111. 1854. [Misspelled *Antephora*.] Texas, *Drummond* [pistillate plant].
- Calanthera dactyloides* Kunth ex Hook., Jour. Bot. Kew Misc. 8: 18. 1856. Based on *Sesleria dactyloides* Nutt.
- Lasiostega humilis* Rupr. ex Munro in Benth., Pl. Hartw. 347. 1857. Name only (error for *Casiostega*). Aguas Calientes, Mexico, *Hartweg* 250.
- Casiostega dactyloides* Fourn., Soc. Bot. Belg. Bul. 15: 470. 1876. Based on *Sesleria dactyloides* Nutt.
- Casiostega hookeri* Rupr. ex Fourn., Soc. Bot. Belg. Bul. 15: 471. 1876, as synonym of *Buchloë dactyloides* Engelm.
- Bouteloua mutica* Griseb. ex Fourn., Soc. Bot. Belg. Bul. 15: 471. 1876, as synonym of *Buchloë dactyloides* Engelm. Mexico, *Schaffner* 134 [staminate plant].
- Melica mexicana* Link ex Fourn., Soc. Bot. Belg. Bul. 15: 471. 1876, as synonym of *Buchloë dactyloides* Engelm.
- Bulbilis dactyloides* Raf. ex Kuntze, Rev. Gen. Pl. 2: 763. 1891. Based on *Sesleria dactyloides* Nutt.

(67) CALAMAGROSTIS Adans.

- (1) **Calamagrostis bolanderi** Thurb. in S. Wats., Bot. Calif. 2: 280. 1880. Mendocino County, Calif., *Bolander* 6471 in part.
- Calamagrostis varia* Boland. ex Thurb. in S. Wats., Bot. Calif. 2: 280. 1880. Not *C. varia* Host, 1809. As synonym of *C. bolanderi* Thurb.
- Deyeuxia bolanderi* Vasey, Grasses U. S. 28. 1883. Based on *Calamagrostis bolanderi* Thurb.

- (3) *Calamagrostis breweri* Thurb. in S. Wats., Bot. Calif. 2: 280. 1880. Carson Pass, Calif., *Brewer* 2128.
Deyeuxia breweri Vasey, Grasses U. S. 28. 1883. Based on *Calamagrostis breweri* Thurb.
- Calamagrostis lemmoni* Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 11: 16. 1898. California, *Lemmon* in 1875.
- (8) *Calamagrostis cainii* Hitchc., Wash. Acad. Sci. Jour. 24: 480. 1934. Mount LeConte, Tenn., *Cain* 48.
- (26) *Calamagrostis californica* Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 11: 37. 1898. Sierra Nevada, Calif., *Lemmon* 444 in 1875.
- (21) *Calamagrostis canadensis* (Michx.) Beauv., Ess. Agrost. 15, 152, 157. 1812. Based on *Arundo canadensis* Michx.
Arundo canadensis Michx., Fl. Bor. Amer. 1: 73. 1803. Canada, *Michaux*.
Arundo agrostoides Pursh, Fl. Amer. Sept. 1: 86. 1814. New Jersey and Pennsylvania.
- Calamagrostis mexicana* Nutt., Gen. Pl. 1: 46. 1818. North America. "*Agrostis mexicana*? Persoon, *Arundo agrostoides* Pursh" are cited. *Agrostis mexicana* L., in Persoon's work is a species of *Muhlenbergia*, but Nuttall's description agrees with Pursh's.
- Calamagrostis agrostoides* Pursh ex Spreng., Syst. Veg. 1: 252. 1825. Presumably based on *Arundo agrostoides* Pursh.
- Cinna purshii* Kunth, Rév. Gram. 1: 67. 1829. Based on *Arundo agrostoides* Pursh.
- Arundo fissa* Willd. ex Steud., Nom. Bot. ed. 2. 1: 144. 1840, as synonym of *Calamagrostis michauxii* Trin.
- Calamagrostis michauxii* Trin. ex Steud., Nom. Bot. ed. 2. 1: 250. 1840. Based on *Arundo canadensis* Michx.
- Calamagrostis hirtigluma* Steud., Syn. Pl. Glum. 1: 188. 1854. Labrador.
- Deyeuxia canadensis* Munro ex Hook. f., Linn. Soc. Trans. 23: 345. 1861. Presumably based on *Arundo canadensis* Michx., indirect citations given. See also, Vasey, Grasses U. S. 28. 1883; Agr. Grasses U. S. 69. pl. 59. 1884; Cassidy, Colo. Agr. Expt. Sta. Bul. 12: 48, with plate. 1890.
- Calamagrostis oregonensis* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 92. 1862. Columbia River, *Nuttall*.
- Calamagrostis columbiensis* Nutt. ex A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 334. 1862. Name only [Columbia River, *Nuttall*].
- Calamagrostis canadensis* var. *robusta* Vasey in Rothr. in Wheeler, U. S. Survey W. 100th Merid. Rpt. 6: 285. 1878. Twin Lakes, Colo., Expl. 100th Merid. [*Wolf*] 1093.
- Calamagrostis pallida* Vasey and Scribn. ex Vasey, U. S. Natl. Herb. Contrib. 3: 79. 1892. Not *C. pallida* C. Muell., 1861. Washington, *Suksdorf* in 1883.
- Calamagrostis blanda* Beal, Grasses N. Amer. 2: 349. 1896. Based on *C. pallida* Vasey and Scribn.
- Calamagrostis canadensis acuminata* Vasey ex Shear and Rydb., U. S. Dept. Agr., Div. Agrost. Bul. 5: 26. 1897. Georgetown, Colo., *Shear* 615 [type]; Montana, Idaho.
- Calamagrostis canadensis* var. *campestris* Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 11: 31. 1898. Louis Plain, Assiniboia, *Macoun* 56.
- Calamagrostis alaskana* Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 11: 32. 1898. Yukon River, Alaska, *Funston* 157.
- Calamagrostis atropurpurea* Nash, N. Y. Bot. Gard. Bul. 2: 153. 1901. Dawson, Yukon Territory, *R. S. Williams* in 1899.
- Calamagrostis anomala* Suksdorf, Allg. Bot. Ztschr. 12: 43. 1906. Mount Paddo [Adams], Wash., *Suksdorf* 2824.
- Calamagrostis langsдорфи* var. *acuminata* Litw., Trav. Mus. Bot. Acad. Sci. Petrograd 18: 52. 1920. Based on *C. canadensis* var. *acuminata* Vasey.
- Calamagrostis canadensis* var. *pallida* Stebbins, Rhodora 32: 45. 1930. Based on *C. pallida* Vasey and Scribn.
- Calamagrostis scribneri* var. *imberbis* Stebbins, Rhodora 32: 46. 1930. Based on *C. anomala* Suksdorf "not Steud., in Lechl., Berb. Am. Aust. 56. (1857)," a name only.
- CALAMAGROSTIS CANADENSIS var. MACOUNIANA (Vasey) Stebbins, Rhodora 32: 41. 1930. Based on *Deyeuxia macouniana* Vasey.
- Deyeuxia macouniana* Vasey, Bot. Gaz. 10: 297. 1885. Northwest Territory, *Macoun*.
- Calamagrostis macouniana* Vasey, U. S. Natl. Herb. Contrib. 3: 81. 1892. Based on *Deyeuxia macouniana* Vasey.
- CALAMAGROSTIS CANADENSIS var. SCABRA (Presl) Hitchc., Amer. Jour. Bot. 21: 135. 1934. Based on *C. scabra* Presl.
- Calamagrostis scabra* Presl, Rel. Haenk. 1: 234. 1830. Nootka Sound, Vancouver Island, *Haenke*.
- Deyeuxia preslii* Kunth, Rév. Gram. 1: Sup. 20. 1830. Based on *Calamagrostis scabra* Presl.
- This variety has been referred to *Calamagrostis langsдорфи* (Link) Trin. by many American authors. A fragment of the type of *Arundo langsдорфи* Link, sent by Dr. Pilger from the Berlin Herbarium, shows that it is not an American species. The rachilla is very minute or wanting, the spikelets are smaller than in *C. scabra*, the glumes are thinner, showing the nerves distinctly,

and the blades are narrower. The following names, typonyms of *C. langsдорфи*, found in American works, belong to the Old World species:

- Arundo langsдорфи* Link, Enum. Pl. 1: 74. 1821. Described from a garden specimen.
- Calamagrostis langsдорфи* Trin., Gram. Unifl. 225. pl. 4. f. 10. 1824. Based on *Arundo langsдорфи* Link.
- Deyeuxia langsдорфи* Kunth, Rév. Gram. 1: 77. 1829. Based on *Arundo langsдорфи* Link.
- Calamagrostis canadensis* var. *langsдорфи* Inman, Rhodora 24: 143. 1922. Based on *Arundo langsдорфи* Link.
- (23) *Calamagrostis cinnoides* (Muhl.) Barton, Compend. Fl. Phila. 1: 45. 1818. Based on *Arundo cinnoides* Muhl.
- Agrostis glauca* Muhl., Descr. Gram. 76. 1817. Not *Calamagrostis glauca* Reichenb., 1830. Pennsylvania, New Jersey, Carolina. Name only, Muhl., Cat. Pl. 10. 1813.
- Arundo cinnoides* Muhl., Descr. Gram. 187. 1817. Pennsylvania, Massachusetts. Name only, Muhl., Cat. Pl. 13. 1813. "*A. confinis* Willd." cited as synonym.
- Arundo conoides* Eaton, Man. ed. 2. 174. 1818. Error for *A. cinnoides* Muhl.
- Arundo coarctata* Torr., Fl. North. and Mid. U. S. 1: 94. 1823. New Jersey.
- Calamagrostis langsдорфи* var. *marylandica* Trin., Gram. Unifl. 225. 1824. Based on *Arundo cinnoides* Muhl.
- Calamagrostis coarctata* Torr. ex Eaton, Man. ed. 5. 144. 1829. Presumably based on *Arundo coarctata* Torr.; *Calamagrostis coarctata* Torr. in A. Gray, N. Amer. Gram. and Cyp. 1: 19. 1834. Based on *Arundo coarctata* Torr. Published as new in Torr., Fl. N. Y. 2: 444. pl. 151. 1843. Based on *A. coarctata* Torr.
- Arundo canadensis* Nutt. ex Steud., Nom. Bot. ed. 2. 1: 144. 1840, as synonym of *Calamagrostis nuttalliana* Steud. [Philadelphia, Nuttall.]
- Calamagrostis nuttalliana* Steud., Nom. Bot. ed. 2. 1: 251. 1840. Based on the species described by Nuttall [from specimen from Philadelphia] as *C. canadensis* (Nutt., Gen. Pl. 1: 46. 1818).
- Deyeuxia nuttalliana* Vasey, Grasses U. S. 28. 1883. Based on *Calamagrostis nuttalliana* Steud.
- (28) *Calamagrostis crassiglumis* Thurb. in S. Wats., Bot. Calif. 2: 281. 1880. Mendocino County, Calif., Bolander 4766, 4787.
- Deyeuxia crassiglumis* Vasey, Grasses U. S. 28. 1883. Based on *Calamagrostis crassiglumis* Thurb.
- Calamagrostis neglecta* var. *crassiglumis* Beal, Grasses N. Amer. 2: 353. 1896. Based on *C. crassiglumis* Thurb.
- (18) *Calamagrostis densa* Vasey, Bot. Gaz. 16: 147. 1891. Julian, San Diego County, Calif., Orcutt.
- Calamagrostis koelerioides* var. *densa* Beal, Grasses N. Amer. 2: 345. 1896. Based on *C. densa* Vasey.
- Calamagrostis vilfaeformis* Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 11: 20. 1898. Based on *C. densa* Vasey.
- (29) *Calamagrostis epigeios* (L.) Roth, Tent. Fl. Germ. 1: 34. 1788. Based on *Arundo epigeios* L.
- Arundo epigeios* L., Sp. Pl. 81. 1753. Europe.
- Calamagrostis georgica* C. Koch, Linnaea 21: 387. 1848. Georgia (Russia) near Tiflis.
- Calamagrostis epigeios* var. *georgica* Ledeb., Fl. Ross. 4: 433. 1853. Based on *C. georgica* C. Koch.
- Calamagrostis arenicola* Fernald, Rhodora 30: 203. 1928. Barnstable County, Mass., Fernald 757.
- (14) *Calamagrostis fernaldii* Louis-Marie, Rhodora 46: 290. pl. 836, f. 4. 1944. Boarstone Mountain, Piscataquis County, Maine, Fernald 427.
- (5) *Calamagrostis foliosa* Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 11: 17. 1898. Based on *C. sylvatica* var. *longifolia* Vasey.
- Calamagrostis sylvatica* var. *longifolia* Vasey, U. S. Natl. Herb. Contrib. 3: 83. 1892. Not *C. longifolia* Hook., 1840. [Humboldt County] Calif., Bolander 6470.
- (2) *Calamagrostis howellii* Vasey, Bot. Gaz. 6: 271. 1881. Oregon, Howell.
- Deyeuxia howellii* Vasey, Grasses U. S. 28. 1883. Based on *Calamagrostis howellii* Vasey.
- (25) *Calamagrostis inexpansa* A. Gray, N. Amer. Gram. and Cyp. 1. No. 20. 1834. Penn Yan, N. Y. Sartwell.
- Calamagrostis stricta* var. *brevior* Vasey in Rothr. in Wheeler, U. S. Survey W. 100th Merid. Rpt. 6: 285. 1878. Mosquito, Colo., [Wolf] 1098.
- Calamagrostis stricta* var. *robusta* Vasey in Rothr. in Wheeler, U. S. Survey W. 100th Merid. Rpt. 6: 285. 1878. Twin Lakes, Colo., [Wolf] 1099.
- Deyeuxia neglecta* var. *americana* Vasey in Macoun, Can. Pl. Cat. 24: 206. 1888. Donald, Columbia Valley, Macoun in 1885.
- Deyeuxia neglecta* var. *robusta* Vasey in Macoun, Can. Pl. Cat. 24: 206. 1888. Alberta, Macoun.
- Deyeuxia glomerata* Vasey ex Macoun, Bot. Gaz. 16: 288. 1891. Name only. Rocky Mountains, British Columbia, J. and J. M. Macoun in 1890.
- Calamagrostis robusta* Vasey, U. S. Natl. Herb. Contrib. 3: 82. 1892. Not *C. robusta* Muell., 1861. Presumably based

- on *C. stricta* var. *robusta* Vasey, the description being an amplification of that.
- Calamagrostis americana* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 5: 27. 1897. Based on *Deyeuxia neglecta* var. *americana* Vasey.
- Calamagrostis inexpansa* var. *cuprea* Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 11: 37. 1898. Falcon Valley, Wash., *Suksdorf* 910.
- Calamagrostis hyperborea* var. *stenodes* Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 11: 39. 1898. Marshall Pass, Colo., *Clements* 206.
- Calamagrostis hyperborea elongata* Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 11: 40. 1898. Plummer County, Nebr., *Rydberg* 1494.
- Calamagrostis hyperborea americana* Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 11: 41. 1898. Based on *Deyeuxia neglecta* var. *americana* Vasey.
- Calamagrostis micrantha* var. *sierrae* Jones, West. Bot. Contrib. 14: 9. 1912. Prattville and Susanville, Calif. [*Jones*.]
- Calamagrostis neglecta* var. *inexpansa* Jones, West. Bot. Contrib. 14: 9. 1912. Based on *C. inexpansa* A. Gray.
- Deyeuxia hyperborea elongata* Lunell, Amer. Midl. Nat. 4: 218. 1915. Based on *Calamagrostis hyperborea elongata* Kearney.
- Deyeuxia hyperborea stenodes* Lunell, Amer. Midl. Nat. 4: 218. 1915. Based on *Calamagrostis hyperborea stenodes* Kearney.
- Calamagrostis elongata* Rydb., Fl. Rocky Mount. 58. 1917. Based on *C. hyperborea elongata* Kearney.
- Calamagrostis wyomingensis* Gandoger, Soc. Bot. France Bul. 667: 299. 1920. Granger, Wyo., [*A.*] *Nelson* 3884.
- Calamagrostis scopulorum* var. *bakeri* Stebbins, Rhodora 32: 47. 1930. Pagosa Peak, Colo., *Baker* 162.
- Calamagrostis inexpansa* var. *robusta* Stebbins, Rhodora 32: 48. 1930. Based on *C. stricta* var. *robusta* Vasey.
- Calamagrostis inexpansa* var. *brevior* Stebbins, Rhodora 32: 50. 1930. Based on *C. stricta* var. *brevior* Vasey.
- Calamagrostis expansa* Rickett and Gilly, Torrey Bot. Club Bul. 69: 464. 1942. Error for *C. inexpansa* A. Gray.
- This species has been referred by American authors to *C. hyperborea* Lange (*C. neglecta* var. *hyperborea* Jones, *Deyeuxia hyperborea* Lunell); and to *C. stricta* Trin.
- CALAMAGROSTIS INEXPANSA** var. **BARBULATA** Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 11: 37. 1898. Mason County, Wash., *Piper* 947.
- CALAMAGROSTIS INEXPANSA** var. **NOVAE-ANGLIAE** Stebbins, Rhodora 32: 51. 1930. Mount Desert, Maine, *Williams* and *Rand* in 1899.
- (12) **Calamagrostis insperata** Swallen, Wash. Acad. Sci. Jour. 25: 413. 1935. Jackson County, Ohio, *Bartley* and *Pontius* in 1934.
- (19) **Calamagrostis koelerioides** Vasey, Bot. Gaz. 16: 147. 1891. Julian, San Diego County, Calif., *Orcutt*.
- (22) **Calamagrostis lactea** Beal, Grasses N. Amer. 2: 346. 1896. Washington, *Suksdorf* 1022.
- Deyeuxia lactea* Beal, Grasses N. Amer. 2: 346. 1896, as synonym of *Calamagrostis lactea* Beal; *Suksdorf*, Deut. Bot. Monatschr. 19: 92. 1901. Based on *C. lactea* Beal.
- Calamagrostis langsfordi lactea* Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 11: 28. 1898. Based on *C. lactea* Beal.
- (13) **Calamagrostis lacustris** (Kearney) Nash, in Britt. and Brown, Illus. Fl. ed. 2. 1: 208. 1913. Based on *C. breviseta* var. *lacustris* Kearney.
- Calamagrostia breviseta* var. *lacustris* Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 11: 25. 1898. Fond du Lac, Minn., *Wood* in 1889.
- Calamagrostis pickingeri* var. *lacustris* Hitchc., Rhodora 8: 210. 1906. Based on *C. breviseta* var. *lacustris* Kearney.
- (7) **Calamagrostis montanensis** Scribn. in Vasey, U. S. Natl. Herb. Contrib. 3: 82. 1892. Montana, *Scribner*. Type is type specimen of *Deyeuxia montanensis* Scribn.
- Deyeuxia montanensis* Scribn., Soc. Prom. Agr. Sci. Proc. 2: 52. 1885. Helena, Mont., *Scribner*.
- Calamagrostis neglecta* var. *candidula* Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 11: 35. 1898. Cypress Hills, Assiniboia, *Macoun* 7483.
- (27) **Calamagrostis neglecta** (Ehrh.) Gaertn., Mey., and Scherb., Fl. Wett. 1: 94. 1799. Based on *Arundo neglecta* Ehrh.
- Arundo neglecta* Ehrh., Beiträge 6: 137. 1791. Europe.
- Deyeuxia neglecta* Kunth, Rév. Gram. 1: 76. 1829. Based on *Arundo neglecta* Ehrh.
- Deyeuxia neglecta* var. *gracilis* Scribn., Bot. Gaz. 11: 175. 1886. Yellowstone Park, *Tweedy* 582.
- Deyeuxia vancouverensis* Vasey, Torrey Bot. Club Bul. 15: 48. 1888. Locality erroneously given as "Vancouver Island," *Macoun* in 1887. Correction made in *Macoun*, Cat. Can. Pl. 24: 207. 1888. Fort George, James Bay, Quebec.
- Deyeuxia neglecta* var. *brevifolia* Vasey in *Macoun*, Can. Pl. Cat. 24: 206. 1888. Pelly Banks, Northwest Territory, *Dawson*.
- Deyeuxia borealis* *Macoun*, Can. Pl. Cat. 24: 207. 1888. Change of name for *D. vancouverensis* Vasey, erroneously ascribed to Vancouver Island; collected at

- Fort George, James Bay, Quebec, *J. M. Macoun*.
- Calamagrostis laxiflora* Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 11: 34. 1898. Not *C. laxiflora* Phil., 1896. Based on "*C. neglecta gracilis* Scribn.," error for *Deyeuxia neglecta gracilis* Scribn.
- Calamagrostis neglecta gracilis* Scribn. ex Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 11: 34. 1898, as synonym of *C. laxiflora* Kearney.
- Calamagrostis micrantha* Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 11: 36. 1898. Prince Albert, Saskatchewan, *Macoun* 13111.
- Calamagrostis lucida* Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 30: 8. 1901. Not *C. laxiflora* Phil. Based on *C. laxiflora* Kearney.
- Calamagrostis neglecta* var. *micrantha* Stebbins, *Rhodora* 32: 55. 1930. Based on *C. micrantha* Kearney.
- (15) *Calamagrostis nubila* Louis-Marie, *Rhodora* 46: 296. pl. 836. f. 1-4. 1944. Lake of the Clouds, Mount Washington, N. H., *Boott*.
- (17) *Calamagrostis nutkaensis* (Presl) Steud., Syn. Pl. Glum. 1: 190. 1854. Based on *Deyeuxia nutkaensis* Presl.
- Deyeuxia nutkaensis* Presl, Rel. Haenk. 1: 250. 1830. Nootka Sound, Vancouver Island, *Haenke*.
- Calamagrostis aleutica* Trin. in Bong., Acad. St. Pétersb. Mém. VI. Math. Phys. Nat. 2: 171. 1832. Unalaska Island, Alaska.
- Deyeuxia aleutica* Munro ex Hook. f., Linn. Soc. Trans. 23: 345. 1862. Based on *Calamagrostis aleutica* Trin.
- Calamagrostis albicans* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 92. 1862. Columbia Plains, Oreg., *Nuttall*.
- Calamagrostis pallida* Nutt. ex A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 334. 1862, as synonym of *C. albicans* Buckl. ["Columbia alluvions." *Nuttall*].
- Calamagrostis albescens* Buckl. ex A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 334. 1862, herbarium name, as synonym of *C. albicans* Buckl.
- Deyeuxia breviaristata* Vasey, Torrey Bot. Club Bul. 15: 48. 1888. Vancouver Island, *Macoun* in 1887.
- Calamagrostis aleutica* var. *patens* Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 11: 20. 1898. Mendocino, Calif. [probably collected by *Bolander*].
- (11) *Calamagrostis perplexa* Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 30: 7. 1901. Based on *C. nemoralis* Kearney.
- Calamagrostis nemoralis* Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 11: 26. 1898. Not *C. nemoralis* Phil., 1896. Ithaca, N. Y., *Dudley* in 1884.
- (16) *Calamagrostis pickeringii* A. Gray, Man. ed. 2. 547. 1856. White Mountains, N. H., *Pickering*.
- Calamagrostis sylvatica* var. *brevisetata* A. Gray, Man. 582. 1848. White Mountains, N. H.
- Deyeuxia pickeringii* Vasey, Grasses U. S. 28. 1883. Based on *Calamagrostis pickeringii* A. Gray.
- Calamagrostis breviseta* Scribn., Torrey Bot. Club Mem. 5: 41. 1894. Based on *C. sylvatica* var. *brevisetata* A. Gray.
- Calamagrostis breviseta* var. *debilis* Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 11: 25. 1898. Newfoundland, *Robinson* and *Schrenk* 205.
- Calamagrostis pickeringii* var. *debilis* Fern. and Wieg., *Rhodora* 15: 135. 1913. Based on *C. breviseta* var. *debilis* Kearney.
- Calamagrostis pickeringii* forma *vivipara* Louis-Marie, *Rhodora* 46: 296. 1944. Digby County, Nova Scotia, *Fernald* and *Long* 19924.
- (10) *Calamagrostis porteri* A. Gray, Amer. Acad. Sci. Proc. 6: 79. 1862. Huntingdon County, Pa., *Porter* in 1862.
- Deyeuxia porteri* Vasey, Grasses U. S. 28. 1883. Based on *Calamagrostis porteri* A. Gray.
- (6) *Calamagrostis purpurascens* R. Br. in Richards., Bot. App. Franklin Jour. 731. 1823. Northern British America.
- Arundo purpurascens* Schult., Mantissa 3 (Add. 1): 603. 1827. Based on *Calamagrostis purpurascens* R. Br.
- Deyeuxia purpurascens* Kunth, Rév. Gram. 1: 77. 1829. Based on *Calamagrostis purpurascens* R. Br.
- Trisetum sesquiflorum* Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 2^e: 14. 1836. Unalaska.
- Calamagrostis sylvatica* var. *purpurascens* Thurb. ex Vasey, U. S. Natl. Herb. Contrib. 3: 83. 1892. [Mount Dana.] Calif., *Bolander* 5071.
- Calamagrostis sylvatica* var. *americana* Vasey, U. S. Natl. Herb. Contrib. 3: 83. 1892. British America to Colorado. [Type, Pen Gulch, Colo., *Vasey* in 1884.]
- Calamagrostis arctica* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 13^e: pl. 55. 1893. St. Paul Island, Bering Sea, *J. M. Macoun*.
- Calamagrostis vaseyi* Beal, Grasses N. Amer. 2: 344. 1896. Cascade Mountains, Wash., *Vasey*.
- Calamagrostis purpurascens arctica* Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 11: 19. 1898. Based on *C. arctica* Vasey.
- Calamagrostis yukonensis* Nash, N. Y. Bot. Gard. Bul. 2: 154. 1901. Dawson, Yukon Territory, *R. S. Williams*.
- Calamagrostis purpurascens* var. *vaseyi* Jones, West Bot. Contrib. 14: 9. 1912. Based on *C. vaseyi* Beal.
- Calamagrostis purpurascens* var. *ophitidis* J. T. Howell, West. Bot. Leaflets 4:

246. 1946. Mount Tamalpais, Calif., J. T. Howell 16334.
- This species has been referred to *Deyeuxia sylvatica* (DC.) Kunth by American authors.
- (9) *Calamagrostis rubescens* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 92. 1862. Oregon, Nuttall.
- Deyeuxia rubescens* Vasey, Grasses U. S. 28. 1883. Based on *Calamagrostis rubescens* Buckl.
- Deyeuxia cusickii* Vasey, Bot. Gaz. 10: 224. 1885. Eagle Mountains, Oreg., Cusick 1159.
- Deyeuxia suksdorfii* Scribn., Torrey Bot. Club Bul. 15: 9. pl. 76. 1888. Washington, Suksdorf 26.
- Calamagrostis aleutica* var. *angusta* Vasey, U. S. Natl. Herb. Contrib. 3: 80. 1892. Santa Cruz, Calif., Anderson.
- Calamagrostis cusickii* Vasey, U. S. Natl. Herb. Contrib. 3: 81. 1892. Based on *Deyeuxia cusickii* Vasey.
- Calamagrostis suksdorfii* Scribn. in Vasey, U. S. Natl. Herb. Contrib. 3: 82. 1892. Based on *Deyeuxia suksdorfii* Scribn.
- Calamagrostis angusta* Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 11: 21. 1898. Based on *C. aleutica* var. *angusta* Vasey.
- Calamagrostis subflexuosa* Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 11: 22. 1898. Oakland, Calif., Bolander 2274.
- Calamagrostis fasciculata* Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 11: 23. 1898. Mendocino County, Calif., Pringle in 1882.
- Calamagrostis suksdorfii* var. *luxurians* Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 11: 24. 1898. Lake Coeur d'Alene, Idaho, Sandberg, Heller, and McDougal 630.
- Calamagrostis luxurians* Rydb., Fl. Rocky Mount. 57. 1917. Based on *Calamagrostis suksdorfii* var. *luxurians* Kearney.
- This species has been referred by some American authors to *Calamagrostis sylvatica* DC., and to *Deyeuxia varia* Kunth.
- (24) *Calamagrostis scopulorum* Jones, Calif. Acad. Sci. Proc. II. 5: 722. 1895. Springdale, Utah, Jones 6075.
- Calamagrostis scopulorum* var. *lucidula* Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 11: 33. 1898. Wasatch Mountains, Utah, Jones 1145.
- (20) *Calamagrostis scribneri* Beal, Grasses N. Amer. 2: 343. 1896. Based on *Deyeuxia dubia* Scribn. and Tweedy.
- Deyeuxia dubia* Scribn. and Tweedy, Bot. Gaz. 11: 174. 1886. Not *Calamagrostis dubia* Bunge, 1854. Yellowstone Park, Tweedy.
- Calamagrostis dubia* Scribn. in Vasey, U. S. Natl. Herb. Contrib. 3: 80. 1892. Based on *Deyeuxia dubia* Scribn. and Tweedy.
- Calamagrostis canadensis* var. *dubia* Vasey, U. S. Natl. Herb. Contrib. 3: 80. 1892.
- Based on *C. dubia* Scribn. and Tweedy.
- Calamagrostis langsdorfii* var. *scribneri* Jones, West. Bot. Contrib. 14: 9. 1912. Based on *C. scribneri* Beal.
- (4) *Calamagrostis tweedyi* (Scribn.) Scribn. in Vasey, U. S. Natl. Herb. Contrib. 3: 83. 1892. Based on *Deyeuxia tweedyi* Scribn.
- Deyeuxia tweedyi* Scribn., Torrey Bot. Club Bul. 10: 64. 1883. Cascade Mountains, Wash., Tweedy.
- (69) **CALAMOVILFA Hack.**
- (2) *Calamovilfa brevipilis* (Torr.) Scribn. in Hack., True Grasses 113. 1890. Based on *Arundo brevipilis* Torr.
- Arundo brevipilis* Torr., Fl. North. and Mid. U. S. 1: 95. 1823. Quaker Bridge, N. J.
- Calamagrostis brevipilis* L. C. Beck, Bot. North. and Mid. States 401. 1833. Based on *Arundo brevipilis* Torr.
- Ammophila brevipilis* Benth. ex Vasey, Grasses U. S. 29. 1883. Based on *Calamagrostis brevipilis* Beck.
- Calamovilfa brevipilis* var. *typica* Fernald, Rhodora 41: 502. 1939. Based on *Arundo brevipilis* Torr.
- CALAMOVILFA BREVIPILIS** var. **CALVIPES** Fernald, Rhodora 41: 501. pl. 573. f. 1. 2. 1939. Greensville County, Va., Fernald and Long 8548.
- CALAMOVILFA BREVIPILIS** var. **HETEROLEPIS** Fernald, Rhodora 41: 502. pl. 573. f. 4. 1939. Harnett County, N. C., Correll and Blomquist 2539.
- (1) *Calamovilfa curtissii* (Vasey) Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 17: 199. f. 495. 1899. Based on *Ammophila curtissii* Vasey.
- Ammophila curtissii* Vasey, Torrey Bot. Club Bul. 11: 7. 1884. Indian River, Fla., Curtiss.
- Calamagrostis curtissii* Vasey, Bot. Gaz. 15: 269. 1890. Based on *Ammophila curtissii* Vasey.
- (4) *Calamovilfa gigantea* (Nutt.) Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 35: 2. 1901. Based on *Calamagrostis gigantea* Nutt.
- Calamagrostis gigantea* Nutt., Amer. Phil. Soc. Trans. (n. s.) 5: 143. 1837. Great Salt River of the Arkansas.
- Toxemia gigantea* Nutt. ex Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 35: 2. 1901, as synonym of *Calamovilfa gigantea*. Salt River, Ark., Nuttall.
- (3) *Calamovilfa longifolia* (Hook.) Scribn. in Hack., True Grasses 113. 1890. Based on *Calamagrostis longifolia* Hook.
- Calamagrostis longifolia* Hook., Fl. Bor. Amer. 2: 241. 1840. Saskatchewan. Drummond.
- Vilfa rigida* Buckl., Acad. Nat. Sci. Phila.

Proc. 1862: 89. 1862. "Oregon?" the locality probably erroneous.

Ammophila longifolia Benth. ex Vasey, Grasses U. S. 29. 1883. Based on *Calamagrostis longifolia* Gray [error for Hook].

Athernotus longifolius Lunell, Amer. Midl. Nat. 4: 218. 1915. Based on *Calamagrostis longifolia* Hook.

CALAMOVILFA LONGIFOLIA var. **MAGNA** Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 35: 3. 1901. Mouth of Kalamazoo River, Mich., Taylor in 1894.

(15) CATABROSA Beauv.

(1) **Catabrosa aquatica** (L.) Beauv., Ess. Agrost. 97, 149, 157. pl. 19. f. 8. 1812. Based on *Aira aquatica* L.

Aira aquatica L., Sp. Pl. 64. 1753. Europe.

Molinia aquatica Wib., Prim. Fl. Werthem. 116. 1799. Based on *Aira aquatica* L.

Poa airoides Koel., Descr. Gram. 194. 1802. Based on *Aira aquatica* L.

Glyceria aquatica Presl, Fl. Cech. 25. 1819. Based on *Aira aquatica* L.

Hydrochloa airoides Hartm., Gen. Gram. Skand. 8. 1819. Based on *Aira aquatica* L.

Catabrosa aquatica var. *uniflora* S. F. Gray, Nat. Arr. Brit. Pl. 2: 133. 1821. Great Britain.

Diarrhena aquatica Raspail, Ann. Sci. Nat., Bot. 5: 447. 1825. Based on *Catabrosa aquatica* Beauv.

Melica aquatica Loisel., Fl. Gall. ed. 2. 1: 59. 1828. Based on *Aira aquatica* L.

Glyceria airoides Reichenb. in Moessl., Handb. Gewächsk. ed. 2. 3: 1827-1829. Based on *Poa airoides* Koel.

Colpodium aquaticum Trin., Acad. St. Pétersb. Mém. VI. Math. Phys. Nat. 1: 395. 1830. Based on *Aira aquatica* L.

Glyceria catabrosa Klett and Richt., Fl. Leipzig 96. 1830. Based on *Catabrosa aquatica* Beauv.

Catapodium aquaticum Trin. ex Willk. and Lange, Prodr. Fl. Hisp. 1: 77. 1861, as synonym of *Catabrosa aquatica* Beauv.

(113) CATHESTECUM Presl

(1) **Cathestecum erectum** Vasey and Hack., Torrey Bot. Club Bul. 11: 37. pl. 45. 1884. Presidio, Tex., Harvard.

This is the species described and figured by Scribner (U. S. Dept. Agr., Div. Agrost. Bul. 7: 242. f. 224. 1897) under the name *Cathestecum prostratum* Presl.

(145) CENCHRUS L.

Cenchrus biflorus Roxb., Hort. Beng. 81. 1814. Name only; Fl. Ind. 1: 238. 1820. Coromandel coast, India.

Cenchrus barbatus Schum., Beskr. Guin. Pl. 63. 1827. Guinea, Africa.

Cenchrus catharticus Delile, Cat. Hort. Monsp. 1838: 4. 1839. Grown from seed from Nubia, Africa.

(2) **Cenchrus brownii** Roem. and Schult., Syst. Veg. 2: 258. 1817. Based on *C. inflexus* R. Br.

Cenchrus inflexus R. Br., Prodr. Fl. Nov. Holl. 1: 195. 1810. Not *C. inflexus* Poir., 1804. Australia.

Cenchrus viridis Spreng., Syst. Veg. 1: 301. 1825. Guadeloupe, [Bertero].

Cenchrus echinatus var. *viridis* Spreng. ex Griseb., Fl. Brit. W. Ind. 556. 1864. Based on *C. viridis* Spreng.

(3) **Cenchrus echinatus** L., Sp. Pl. 1050. 1753. Jamaica, Curaçao.

Cenchrus pungens H. B. K., Nov. Gen. et Sp. 1: 115. 1815. Guayaquil, Ecuador, Humboldt and Bonpland.

Cenchrus brevisetus Fourn., Mex. Pl. 2: 50. 1886. Orizaba, Mexico, Schaffner 198; Bourgeau 3140; Botteri 133.

Cenchrus echinatus brevisetus Scribn. in Millsp., Field Mus. Bot. 2: 26. 1900. Based on *Cenchrus brevisetus* Fourn.

(4) **Cenchrus gracillimus** Nash, Torrey Bot. Club Bul. 22: 299. 1895. Eustis, Fla., Nash 188 [type], 288.

(5) **Cenchrus incertus** M. A. Curtis, Boston Soc. Nat. Hist. Jour. 1: 135. 1837. Smithville, N. C., Curtis.

?*Cenchrus carolinianus* Walt., Fl. Carol 79. 1788. South Carolina.

Cenchrus strictus Chapm., Bot. Gaz. 3: 20. 1878. West Florida, [Chapman].

?*Nastus carolinianus* Lunell, Amer. Midl. Nat. 4: 214. 1915. Based on *Cenchrus carolinianus* Walt.

(1) **Cenchrus myosuroides** H. B. K., Nov. Gen. et Sp. 1: 115. pl. 35. 1815. Flamingo Key, Cuba, Humboldt and Bonpland.

Panicum cenchroides Ell., Bot. S. C. and Ga. 1: 111. 1816. Not *P. cenchroides* L. Rich., 1792. Jekyll Island, Ga., Baldwin.

Pennisetum pungens Nutt., Gen. Pl. 1: 54. 1818. Based on *Panicum cenchroides* Ell.

Setaria eliottiana Schult., Mantissa 2: 279. 1824. Based on *Panicum cenchroides* Ell.

Pennisetum myosuroides Spreng., Syst. Veg. 1: 303. 1825. Based on *Cenchrus myosuroides* H. B. K.

Cenchrus eliottii Kunth, Rév. Gram. 1: 51. 1829. Based on *Panicum cenchroides* Ell.

Cenchrus alopecuroides Presl, Rel. Haenk. 1: 317. 1830. Not *C. alopecuroides* Thunb., 1794. Original locality unknown, probably Peru.

Cenchrus setoides Buckl., Tex. Geol. Agr. Survey Prel. Rpt. App. 2. 1866. Northern Texas [Linscum and Buckley].

Cenchropsis myosuroides Nash in Small,

- Fl. Southeast. U. S. 109, 1327. 1903. Based on *Cenchrus myosuroides* H. B. K.
- (6) *Cenchrus pauciflorus* Benth., Bot. Voy. Sulph. 56. 1840. Magdalena Bay, Baja California, [Barclay].
- Cenchrus roseus* Fourn., Mex. Pl. 2: 50. 1886. Vera Cruz, Mexico, Gouin 42 in part, 43.
- Cenchrus echinatus* forma *longispina* Hack. in Kneucker, Allg. Bot. Ztschr. 9: 169. 1903. Oxford, Conn., Harger, Gram. Exs. Kneucker 426.
- Cenchrus albertsonii* Runyon, Amer. Jour. Bot. 26: 485. f. 1, 2. 1939. Woodward, Okla., Runyon 200.
- Cenchrus longispinus* Fernald, Rhodora 45: 388. 1943. Based on *C. echinatus* forma *longispina* Hack.
- Cenchrus pauciflorus* var. *longispinus* Jensen and Wachter, Nederl. Kruid. Archief 56: 246. 1949. Based on *C. echinatus* forma *longispinus* Hack.
- (7) *Cenchrus tribuloides* L., Sp. Pl. 1050. 1753. Seacoast of Virginia, [Clayton].
- Cenchrus echinatus* var. *tribuloides* Torr., Fl. North. and Mid. U. S. 1: 69. 1823. Based on *C. tribuloides* L.
- Cenchrus vaginatus* Steud., Syn. Pl. Glum. 1: 110. 1854. Cultivated in the botanical garden, Paris.
- Cenchrus tribuloides* var. *macrocephalus* Doell, in Mart., Fl. Bras. 2²: 312. 1877. Brazil, Martius.
- Cenchrus macrocephalus* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 17: 110. f. 406. 1899. Based on *C. tribuloides* var. *macrocephalus* Doell.
- (110) **CHLORIS** Swartz
- (7) *Chloris andropogonoides* Fourn., Mex. Pl. 2: 143. 1886. San Luis Potosí, Mexico, Virlet 1462.
- Chloris tenuispica* Nash, Torrey Bot. Club Bul. 25: 436. 1898. Texas, Nealley in 1889.
- Chloris argentina* (Hack.) Lillo and Parodi, Physis 4: 180. 1918. Based on *C. distichophylla* var. *argentina* Hack.
- Chloris distichophylla* var. *argentina* Hack. ex Stuck., An. Mus. Nac. Buenos Aires 11: 113. 1904. Argentina, Stuckert.
- Chloris berroi* Arech., Anal. Mus. Nac. Montevideo 1: 388. pl. 44. 1896. Uruguay, Berro.
- Chloris cantérai* Arech., Anal. Mus. Nac. Montevideo 1: 385. 1896. Paysandú, Uruguay.
- Chloris capensis* (Houtt.) Thell., Repert. Sp. Nov. Fedde 10: 289. 1912. Based on *Andropogon capense* Houtt.
- Andropogon capense* Houtt. Nat. Hist. II. 13: Aanwyz. Plaat. [2]. pl. 103. f. 3. 1782; Panzer, Pflanzensyst. 12: Verzeich. Kuppertaf. [4]. pl. 93. f. 3. 1785. Cape of Good Hope, Africa.
- (6) *Chloris chloridea* (Presl) Hitchc., Biol. Soc. Wash. Proc. 41: 162. 1928. Based on *Dineba chloridea* Presl.
- Dineba chloridea* Presl, Rel. Haenk. 1: 291. 1830. Mexico, Haenke.
- Eutriana chloridea* Kunth, Rév. Gram. 1: Sup. 23. 1830. Based on *Dineba chloridea* Presl.
- Gymnopogon longifolius* Fourn., Mex. Pl. 2: 144. 1886. Vera Cruz, Mexico, Gouin 52.
- Gymnopogon virletii* Fourn., Mex. Pl. 2: 144. 1886. San Luis Potosí, Mexico, Virlet 1441.
- Chloris longifolia* Vasey, U. S. Natl. Herb. Contrib. 1: 284. pl. 19. 1893. Not *C. longifolia* Steud., 1854. Based on *Gymnopogon longifolius* Fourn.
- Chloris clandestina* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 24: 25. 1901. Based on *Gymnopogon longifolius* Fourn.
- (11) *Chloris ciliata* Swartz, Prodr. Veg. Ind. Occ. 25. 1788. Jamaica, Swartz.
- Cynodon ciliatus* Raspail, Ann. Sci. Nat., Bot. 5: 303. 1825. Based on *Chloris ciliata* Swartz.
- Chloris propinqua* Steud., Syn. Pl. Glum. 1: 204. 1854. Guadeloupe, Duchassaing.
- Chloris ciliata* var. *texana* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 12¹: pl. 30. 1890. Brownsville, Tex. [Nealley].
- Chloris texana* Nash, Torrey Bot. Club Bul. 25: 441. 1898. Based on *C. ciliata* var. *texana* Vasey.
- Chloris nashii* Heller, Muhlenbergia 5: 120. 1909. Based on *C. texana* Nash.
- (15) *Chloris cucullata* Bisch., Ann. Sci. Nat., Bot. III. 19: 357. 1853. Cultivated, seed from Matamoros, Mexico.
- Chloris distichophylla* Lag., Gen. et Sp. Nov. 4. 1816. Argentina and Chile.
- Eustachys distichophylla* Nees, Agrost. Bras. 418. 1829. Based on *Chloris distichophylla* Lag.
- (3) *Chloris floridana* (Chapm.) Wood, Amer. Bot. and Flor. pt. 2: 407. 1871. Based on *Eustachys floridana* Chapm.
- Eustachys floridana* Chapm., Fl. South. U. S. 557. 1860. Middle Florida.
- (5) *Chloris gayana* Kunth, Rév. Gram. 1: 89. 1829. Senegal, Africa.
- (1) *Chloris glauca* (Chapm.) Wood, Amer. Bot. and Flor. pt. 2: 407. 1871. Based on *Eustachys glauca* Chapm.
- Eustachys glauca* Chapm., Fl. South. U. S. 557. 1860. West Florida.
- (14) *Chloris latisquamea* Nash, Torrey Bot. Club Bul. 25: 439. 1898. Kerrville, Tex., Heller 1767.
- Chloris verticillata* var. *intermedia* Vasey, in Coult., U. S. Nat. Herb. Contrib. 2: 528. 1894. Texas, [Houston, Hall 773].
- (4) *Chloris neglecta* Nash, Torrey Bot. Club Bul. 22: 423. 1895. Orange Bend, Fla., Nash 2149.
- Eustachys neglecta* Nash, Torrey Bot.

- Club Bul. 25: 450. 1898. Based on *Chloris neglecta* Nash.
- (2) *Chloris petraea* Swartz, Prodr. Veg. Ind. Occ. 25. 1788. Jamaica, Swartz. ?*Aira aegilopsoides* Walt., Fl. Carol. 78. 1788. South Carolina.
- Agrostis complanata* Ait., Hort. Kew. 1: 96. 1789. Grown in England, seed from Jamaica.
- Eustachys petraea* Desv., Nouv. Bul. Soc. Philom. Paris 2: 189. 1810. Based on *Chloris petraea* Swartz.
- Schultesia petraea* Spreng., Pl. Pugill. 2: 17. 1815. Based on *Chloris petraea* Swartz.
- Aira complanata* Steud., Nom. Bot. ed. 2. 1: 44. 1840, as synonym of *Chloris petraea* Swartz.
- Chloris swartzii* C. Muell., Bot. Ztg. 19: 341. 1861. Based on *C. petraea* Swartz.
- Chloris septentrionalis* C. Muell., Bot. Ztg. 19: 340. 1861. Rio Brazos, Tex., Drummond.
- Chloris swartziana* Doell in Mart., Fl. Bras. 2³: 68. 1878. Based on *C. petraea* Swartz.
- (10) *Chloris polydactyla* (L.) Swartz, Prodr. Veg. Ind. Occ. 26. 1788. Based on *Andropogon polydactylon* L.
- Andropogon barbatus* L., Syst. Nat. ed. 10. 2: 1305. 1759. Jamaica. Not *Chloris barbata* Swartz, 1797, based on *A. barbatus* L., 1771, from the East Indies, which is *C. inflata* Link (*C. paraguayensis* Steud.).
- Andropogon polydactylon* L., Sp. Pl. ed. 2. 2: 1483. 1763. Jamaica. Diagnosis of *A. barbatus* L. (1759) copied.
- Saccharum polydactylum* Thunb., Fl. Jap. 42. 1784. Based on *Andropogon polydactylon* L.
- Chloris barbata* Nash, Torrey Bot. Club Bul. 25: 443. 1898. Not *C. barbata* Swartz, 1797. Based on *Andropogon barbatus* L. (1759).
- Chloris prieurii* Kunth, Rév. Gram. 1. 89. 1829. Senegambia, Africa.
- Chloris radiata* (L.) Swartz, Prodr. Veg. Ind. Occ. 26. 1788. Based on *Agrostis radiata* L.
- Agrostis radiata* L., Syst. Nat. ed. 10. 2: 873. 1759. Jamaica.
- Chloris glaucescens* Steud., Syn. Pl. Glum. 1: 206. 1854. Guadeloupe, Duchaissing.
- (13) *Chloris subdolichostachya* C. Muell., Bot. Ztg. 19: 341. 1861. Texas, Drummond 372.
- Chloris verticillata* var. *aristulata* Torr. and Gray, U. S. Expl. Miss. Pacif. Rpt. 2: 176. 1855. Lower Rio Grande, Gregg.
- Chloris brevispica* Nash, Torrey Bot. Club Bul. 25: 438. 1898. Nueces County, Tex., Heller 1471.
- Chloris submutica* H. B. K., Nov. Gen. et Sp. 1: 167. pl. 50. 1816. Mexico, Humboldt and Bonpland.
- (8) *Chloris texensis* Nash, Torrey Bot. Club Bul. 23: 151. 1896. Texas, Thurrow; Nealley.
- Chloris nealleyi* Nash, Torrey Bot. Club Bul. 25: 435. 1898. Based on *C. texensis* Nash, not *C. texana* (Vasey) Nash, 1890.
- Chloris truncata* R. Br., Prodr. Fl. Nov. Holl. 186. 1810. Australia.
- Chloris ventricosa* R. Br., Prodr. Fl. Nov. Holl. 186. 1810. Australia.
- (12) *Chloris verticillata* Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 150. 1837. Fort Smith, Ark., [Nuttall].
- (9) *Chloris virgata* Swartz, Fl. Ind. Occ. 1. 203. 1797. Antigua, Swartz.
- Chloris pubescens* Lag., Var. Cien. 4: 143. 1805. [Peru.]
- Rabdochloa virgata* Beauv., Ess. Agrost. 84, 158. 1812. Presumably based on *Chloris virgata* Swartz.
- Chloris compressa* DC., Cat. Hort. Monsp. 94. 1813. Cultivated at Montpellier.
- Chloris elegans* H. B. K., Nov. Gen. et Sp. 1: 166. pl. 49. 1816. Mexico, Humboldt and Bonpland.
- Chloris alba* Presl, Rel. Haenk. 1: 289. 1830. Mexico, Haenke.
- Chloris penicillata* Willd. ex Steud., Nom. Bot. ed. 2. 1: 353. 1840, as synonym of *C. elegans* H. B. K.
- Chloris alba* var. *aristulata* Torr., U. S. Expl. Miss. Pacif. Rpt. 4: 155. 1857. Banks of the upper Rio Grande [Emory Exped.]; Tex., Drummond 395 also mentioned.
- Agrostomia barbata* Cervant., Naturaleza 1: 346. 1870. Cuernavaca, Mexico.

(158) CHRYSOPOGON Trin.

- (1) *Chrysopogon pauciflorus* (Chapm.) Benth. ex Vasey, Grasses U. S. 1883. Based on *Sorghum pauciflorum* Chapm.
- Sorghum pauciflorum* Chapm., Bot. Gaz. 3: 20. 1878. Jacksonville, Fla., Chapman.
- Chrysopogon wrightii* Munro ex Vasey, Descr. Cat. Grasses U. S. 29. 1885. Based on *Sorghum pauciflorum* Chapm.
- Andropogon pauciflorus* Hack. in DC., Monogr. Phan. 6: 548. 1889. Based on *Sorghum pauciflorum* Chapm.
- Rhaphis pauciflorus* Nash in Small, Fl. Southeast. U. S. 67. 1903. Based on *Sorghum pauciflorum* Chapm.

(74) CINNA L.

- (1) *Cinna arundinacea* L., Sp. Pl. 5. 1753. Canada, Kalm.
- Agrostis cinna* Retz., Obs. Bot. 5: 18. 1789. Based on *Cinna arundinacea* L. but, according to Obs. Bot. 6: 12. 1791, misapplied to a species of *Muhlenbergia*.
- Agrostis cinna* Lam., Tabl. Encycl. 1: 162. 1791. Based on *Cinna arundinacea* L.

Agrostis cinna Pursh, Fl. Amer. Sept. 1: 64. 1814. Based on *Cinna arundinacea* Willd. (error for L.).

Cinna agrostoides Beauv. ex Steud., Nom. Bot. 1: 20, 198. 1821, as synonym of *Agrostis cinna* Lam.

Muhlenbergia cinna Trin., Gram. Unifl. 191. 1824. Based on *Agrostis cinna* Lam.

CINNA ARUNDINACEA var. *INEXPANSA* Fern. and Griseb., Rhodora 37: 135. pl. 334. f. 1, 2. 1935. Virginia Beach, Va., Fernald and Long 3648.

(2) *Cinna latifolia* (Trevir.) Griseb. in Ledeb., Fl. Ross. 4: 435. 1853. Based on *Agrostis latifolia* Trevir.

Agrostis latifolia Trevir. ex Göpp., Beschr. Bot. Gart. Breslau 82. 1830. Europe.

Muhlenbergia pendula Trin., Acad. St. Pétersb. Mém. VI. Math. Phys. Nat. 2: 172. 1832. Sitka.

Cinna expansa Link, Hort. Berol. 2: 236. 1833. Western North America, Richardson.

Cinna pendula Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4: 280. 1841. Norway, Sitka, Baikal. The earlier *Muhlenbergia pendula* Trin., not mentioned.

Cinna arundinacea var. *pendula* A. Gray, Man. ed. 2. 545. 1856. Based on *C. pendula* Trin.

Cinna pendula var. *glomerula* Scribn., Acad. Nat. Sci. Phila. Proc. 1884: 290. 1884. Washington, Tweedy.

Cinna bolanderi Scribn., Acad. Nat. Sci. Phila. Proc. 1884: 290. 1884. California, Bolander 6090.

Cinna pendula var. *acutiflora* Vasey ex Macoun, Can. Pl. Cat. 2^a: 203. 1888, name only, Vancouver Island; 2^b: 393. 1890, as synonym of *C. pendula* var. *glomerata* Scribn. [error for var. *glomerula*].

Cinna pendula var. *mutica* Vasey in Macoun, Can. Pl. Cat. 2^a: 202. 1888. Name only for collection at Pelly Banks, Northwest Territory, Dawson in 1887; Vasey, U. S. Natl. Herb. Contrib. 3: 57. 1892. Oregon, [Cusick].

Cinna pendula var. *bolanderi* Vasey, U. S. Natl. Herb. Contrib. 3: 57. 1892. Based on *C. bolanderi* Scribn.

(165) COIX L.

(1) *Coix lacryma-jobi* L., Sp. Pl. 972. 1753. India.

Coix lacryma L., Syst. Nat. ed. 10. 1261. 1759. Based on *C. lacryma-jobi* L.

Lithagrostis lacryma-jobi Gaertn., Fruct. et Sem. 1: 7. 1788. Based on *Coix lacryma-jobi* L.

Sphaerium lacryma Kuntze, Rev. Gen. Pl. 2: 793. 1891. Based on *Coix lacryma* L.

(73) COLEANTHUS Seidel

(1) *Coleanthus subtilis* (Tratt.) Seidel in Roem. and Schult., Syst. Veg. 2: 276. 1817. Based on *Schmidtia subtilis* Tratt. *Schmidtia subtilis* Tratt., Fl. Oesterr. 1: 12. 1816. Bohemia.

Zizania subtilis Raspail, Ann. Sci. Nat., Bot. 5: 452, 458. 1825. Based on *Coleanthus subtilis* [Seidel] Roem. and Schult.

Wilibaldia subtilis Roth, Enum. Pl. Phan. Germ. 1: 92. 1827. Based on *Schmidtia subtilis* Tratt.

Smidetia humilis Raf., Autikon Bot. 187. 1840. Based on *Schmidtia subtilis* Tratt.

CORIDOCCHLOA Nees

Coridochloa cimicina (L.) Nees ex Jacks., Ind. Kew. 1: 618. 1893, as synonym of *Panicum cimicinum*; Chase, Biol. Soc. Wash. Proc. 24: 129. 1911. This name is usually credited to Nees, Edinb. New Phil. Jour. 15: 381. 1833, but though Nees adds, after briefly distinguishing the genus, that its type is *Panicum cimicinum* Retz., he does not transfer the name to *Coridochloa*.

Milium cimicinum L., Mant. Pl. 2: 184. 1771. Malabar, India.

Agrostis digitata Lam., Encycl. 1: 59. 1783. "*Milium cimicinum* L." cited and description from "L. Mant. 184" quoted. Malabar.

Panicum cimicinum Retz., Obs. Bot. 3: 9. 1783. Based on *Milium cimicinum* L.

Axonopus? cimicinus Beauv., Ess. Agrost. 12, 154. 1812. Based on *Milium cimicinum* L.

(27) CORTADERIA Stapf

Cortaderia rudiusscula Stapf, Gard. Chron. III. 22: 396. 1897. Argentina.

This is the species described by Stapf under *C. quila* (Nees) Stapf, but that name is ultimately based on *Arundo quila* Molina, a species of bamboo, *Chusquea quila* (Molina) Kunth.

(1) *Cortaderia selloana* (Schult.) Aschers. and Graebn., Syn. Mitteleur. Fl. 2: 325. 1900. Based on *Arundo selloana* Schult.

Arundo dioeca Spreng., Syst. Veg. 1: 361. 1825. Not *A. dioica* Lour., 1793. Monte Video, Uruguay, *Sello*.

Arundo selloana Schult., Mantissa 3 (Add. 1): 605. 1827. Based on *A. dioeca* Spreng. Schultes cites "*A. dioeca* Spreng., S.V. p. 361," hence the date is later than 1824, the title-page date.

Gynierium argenteum Nees, Agrost. Bras. 462. 1829. Brazil.

Cortaderia argentea Stapf, Gard. Chron. III. 22: 396. 1897. Based on *Gynierium argenteum* Nees.

Cortaderia dioica Speg., An. Mus. Nac.

Buenos Aires 7: 194. 1902. Based on *Arundo dioica* Spreng.

(60) CORYNEPHORUS Beauv.

- (1) *Corynephorus canescens* (L.) Beauv., Ess. Agrost. 90, 149, 159. 1812. Based on *Aira canescens* L.
Aira canescens L., Sp. Pl. 65. 1753. Europe.
Avena canescens Web. in Wigg., Prim. Fl. Hols. 9. 1780. Based on *Aira canescens* L.
Weingaertneria canescens Bernh., Syst. Verz. Pflanz. 51. 1800. Based on *Aira canescens* L.

(38) COTTEA Kunth

- (1) *Cottea pappophoroides* Kunth, Rév. Gram. 1: 84. 1829. Peru.

(85) CRYPSIS Ait.

- (1) *Crypsis niliaca* Fig. and De Not., Mem. Accad. Torino II. 14: 322. 1854. (Separate 1853.) Island in the Nile, lower Egypt.
 Referred to *C. aculeata* (L.) Ait. in Manual, ed. 1. That species is not known from America.

(108) CTENIUM Panzer

- (1) *Ctenium aromaticum* (Walt.) Wood, Class-book ed. 1861. 806. 1861. Based on *Aegilops aromatica* Walt.
 ? *Nardus gangitis* L., Sp. Pl. 53. 1753. Garden specimen, southern France, (probably Montpellier). The specimen under this name in the Linnaean Herbarium is from Montpellier and is said by Munro (Jour. Linn. Soc. Bot. 6: 35. 1862) to be *Lepturus incurvatus* Trin. (*Parapholis incurvus* (L.) C. E. Hubb.). The Linnaean citations refer to *Andropogon* and to *Rottboellia* according to Trinius (Clav. Agrost. 346. 1822), except that to Morison (Pl. Hist. 3: Sect. 8, tab. 3, last figure) which is a species of *Ctenium*. Linnaeus gives as the origin of his plant "Habitat in G. Narbonensi" (Gallia Narbonensis is southern France). The application of the name *N. gangitis* is too uncertain to be accepted for *Ctenium aromaticum*, as proposed by Druce.
Aegilops aromatica Walt., Fl. Carol. 249. 1788. South Carolina.
Nardus scorpioides Lam., Tabl. Encycl. 1: 152. 1791. America.
Chloris monostachya Michx., Fl. Bor. Amer. 1: 59. 1803. South Carolina, Michaux.
Campulosus gracilior Desv., Nouv. Bul. Soc. Philom. (Paris) 2: 189. 1810. Based on *Chloris monostachya* Michx.
Campulosus monostachyus Beauv., Ess.

- Agrost. 64, 157, 158. pl. 13. f. 1. 1812. Based on *Chloris monostachya* Michx.
Ctenium carolinianum Panz., Denkschr. Bayer. Akad. Wiss. 4: 311. pl. 13. f. 1, 2. 1813. South Carolina.
Campuloo gracilis Desv., Jour. Bot. 1: 69. 1813. Based on *Chloris monostachya* Michx.
Monocera aromatica Ell., Bot. S. C. and Ga. 1: 177. pl. 11. f. 3. 1816. Based on *Aegilops aromatica* Walt.
Campuloo monostachya Roem. and Schult., Syst. Veg. 2: 516. 1817. Based on *Chloris monostachya* Michx.
 ? *Monerma ? gangitis* Roem. and Schult., Syst. Veg. 2: 800. 1817. Based on *Nardus gangitis* L.
Triatherus aromaticus Raf., Amer. Month. Mag. 3: 99. 1818. Based on *Monocera aromatica* Ell.
Cynodon monostachyos Raspail, Ann. Sci. Nat., Bot. 5: 303. 1825. Based on *Campulosus monostachyus* Desv. [error for Beauv.].
Ctenium americanum Spreng., Syst. Veg. 1: 274. 1825. North America, *Chloris monostachya* Michx., cited as synonym.
Aplocera maritima Raf., Med. Fl. 2: 193. 1830. *Aplocera* proposed as change of name for *Monocera* Ell., no basis given for the specific name.
Campulosus aromaticus Trin. ex Steud., Nom. Bot. ed. 2. 1: 272. 1840, as synonym of *C. monostachyus* Beauv.
Chloris piperita Michx. ex Steud., Nom. Bot. ed. 2. 1: 353. 1840, as synonym of *Campulosus monostachyus* Beauv.
Rottboellia scorpioides Poir. ex Steud. Nom. Bot. ed. 2. 2: 474. 1841, as synonym of *Ctenium americanum* Spreng.
Campulosus gracilis Bertol., Accad. Sci. Bologna Mem. 2: 602. pl. 43. f. a.b.c. 1850. Alabama.
 ? *Campulosus gangitis* Kuntze, Rev. Gen. Pl. 2: 764. 1891. Based on *Nardus gangitis* L., taken up for *Ctenium aromaticum*.
Campulosus aromaticus Scribn., Torrey Bot. Club Mem. 5: 45. 1894. Based on *Aegilops aromaticus* Walt.
 ? *Ctenium gangitum* Druce, Bot. Exch. Club Brit. Isles Rpt. 3: 416. 1914. Based on *Nardus gangitis* L., taken up for *C. aromaticum*.
 (2) *Ctenium floridanum* (Hitche.) Hitche., Biol. Soc. Wash. Proc. 41: 162. 1928. Based on *Campulosus floridanus* Hitche.
Campulosus floridanus Hitche., Amer. Jour. Bot. 2: 306. 1915. East Florida, Curtiss in 1875.
 This is the species described by Scribner (U. S. Dept. Agr., Div. Agrost. Bul. 7: 197. f. 179. 1897) and by Nash (Small, Fl. Southeast. U. S. 133. 1903) under *Campulosus chapadensis* Trin. That is a Brazilian species not known from North America.

Cutandia memphitica (Spreng.) Richt. Pl. Eur. 1: 77. 1890. Based on *Dactylis memphitica* Spreng.
Dactylis memphitica Spreng., Nachtr. Bot. Gart. Halle 20. 1801. Egypt.

CYMBOPOGON Spreng.

Cymbopogon citratus (DC.) Stapf, Kew Bul. Misc. Inf. 1906: 322. 1906. Based on *Andropogon citratus* DC.
Andropogon citratus DC., Cat. Hort. Monsp. 78. 1813, without description. DC. ex Nees, Allg. Gartenz. 3: 267. 1835. Garden plant.
Cymbopogon nardus (L.) Rendle, Cat. Afr. Pl. Welw. 2: 155. 1899. Based on *Andropogon nardus* L.
Andropogon nardus L., Sp. Pl. 1046. 1753. India.
Sorghum nardus Kuntze, Rev. Gen. Pl. 2: 792. 1891. Based on *Andropogon nardus* L.

(103) CYNODON L. Rich.

(1) **Cynodon dactylon** (L.) Pers., Syn. Pl. 1: 85. 1805. Based on *Panicum dactylon* L.
Panicum dactylon L., Sp. Pl. 58. 1753. Southern Europe.
Digitaria dactylon Scop., Fl. Carn. ed. 2. 1: 52. 1772. Based on *Panicum dactylon* L.
Dactilon officinale Vill., Hist. Pl. Dauph. 2: 69. 1787. Based on *Panicum dactylon* L.
? *Cynosurus uniflorus* Walt., Fl. Carol. 82. 1788. South Carolina.
Paspalum dactylon Lam., Tabl. Encycl. 1: 176. 1791. Based on *Panicum dactylon* L.
Digitaria littoralis Salisb., Prodr. Stirp. 19. 1796. Based on *Panicum dactylon* L.
Milium dactylon Moench, Meth. Pl. Sup. 67. 1802. Based on *Panicum dactylon* L.
Fibichia umbellata Koel., Descr. Gram. 308. 1802. Based on *Panicum dactylon* L.
Digitaria stolonifera Schrad., Fl. Germ. 1: 165. 1806. Based on *Panicum dactylon* L.
Cynodon maritimus H. B. K., Nov. Gen. et Sp. 1: 170. 1816. Peru, *Humboldt* and *Bonpland*.
Cynodon tenuis Trin. in Spreng., Neu. Entd. 2: 63. 1821. North America.
Chloris cynodon Trin., Gram. Unifl. 229. 1824. Based on *Cynodon dactylon* Pers.
Digitaria maritima Spreng., Syst. Veg. 1: 272. 1825. Based on *Cynodon maritimus* H. B. K.
Cynodon erectus Presl, Rel. Haenk. 1: 290. 1830. Mexico [type, *Haenke*] and Peru.
Agrostis bermudiana Tussac ex Kunth,

Enum. Pl. 1: 259. 1833, as synonym of *Cynodon dactylon* Pers.

Cynodon occidentalis Willd. ex Steud., Nom. Bot. ed. 2. 1: 463. 1840, as synonym of *C. dactylon* Pers.

Cynodon portoricensis Willd. ex Steud., Nom. Bot. ed. 2. 1: 463. 1840, as synonym of *C. dactylon* Pers.

Capriola dactylon Kuntze, Rev. Gen. Pl. 2: 764. 1891. Based on *Panicum dactylon* L.

Fibichia dactylon Beck, Wiss. Mitt. Bosn. Herzeg. 9: 436. 1904. Based on *Panicum dactylon* L.

Cynodon dactylon var. *maritimus* Hack. in Fries, Arkiv Bot. 8: 40. 1909. Based on *C. maritimus* H. B. K.

Capriola dactylon maritima Hitchc., U. S. Dept. Agr. Bul. 772: 179. 1920. Based on *Cynodon maritimus* H. B. K.

Cynodon transvaalensis Burt-Davy,²² Kew Bul. Misc. Inf. 1921: 281. 1921. Transvaal, South Africa, *Burt-Davy* 18156.

(24) CYNOSURUS L.

(1) **Cynosurus cristatus** L., Sp. Pl. 72. 1753. Europe.
(2) **Cynosurus echinatus** L., Sp. Pl. 72. 1753. Europe.
Phalona echinata Dum., Obs. Gram. Belg. 114. 1823. Based on *Cynosurus echinatus* L.

(23) DACTYLIS L.

(1) **Dactylis glomerata** L., Sp. Pl. 71. 1753. Europe.
Bromus glomeratus Scop., Fl. Carn. ed. 2. 1: 76. 1772. Based on *Dactylis glomerata* L.
Festuca glomerata All., Fl. Pedem. 2: 252. 1785. Based on *Dactylis glomerata* L.
Limnetis glomerata Eaton, Man. 14. 1817. Based on *Dactylis glomerata* L.
Trachypoa vulgaris Bubani, Fl. Pyr. 4: 359. 1901. Based on *Dactylis glomerata* L.

(101) DACTYLOCTENIUM Willd.

(1) **Dactyloctenium aegyptium** (L.) Beauv., Ess. Agrost. Expl. Pl. 15, 159. 1812. Based on *Cynosurus aegyptius* L. The same combination made by Richt. Pl. Eur. 1: 68. 1890, based on the same species.
Cynosurus aegyptius L., Sp. Pl. 72. 1753. Africa, Asia, America.
Aegilops saccharinum Walt., Fl. Carol. 249. 1788. South Carolina.
Eleusine aegyptiaca Desf., Fl. Atlant. 1: 85. 1798. Based on *Cynosurus aegyptius* L.

²² J. Burt-Davy in earlier papers on American grasses used Davy as author, as in *Elymus divergens* and others, but in later papers used Burt-Davy.

- Eleusine pectinata* Moench, Meth. Pl. Sup. 68. 1802. Based on *Cynosurus aegyptius* L.
- Chloris mucronata* Michx., Fl. Bor. Amer. 1: 59. 1803. Carolina, Michaux.
- Eleusine aegyptia* Pers., Syn. Pl. 1: 87. 1805. Based on *Cynosurus aegyptius* L.
- Dactyloctenium aegyptiacum* Willd., Enum. Pl. 1029. 1809. Based on *Cynosurus aegyptius* L.
- Dactyloctenium mucronatum* Willd., Enum. Pl. 1029. 1809. Based on *Chloris mucronata* Michx.
- Eleusine mucronata* Stokes, Bot. Mat. Med. 1: 150. 1812. Not *E. mucronata* Michx., 1803. Jamaica, Broughton.
- Rabdochloa mucronata* Beauv., Ess. Agrost. 84, 158, 176. 1812. Presumably based on *Chloris mucronata* Michx.
- Cenchrus aegyptius* L. ex Beauv., Ess. Agrost. 157. 1812, as synonym of *Dactyloctenium aegyptium*, doubtless error for *Cynosurus*.
- Eleusine egyptia* Raf., Précis Décour. Somiol. 45. 1814.
- Eleusine aegyptia* Raf., Chloris Aetn. 7. 1815.
- Eleusine cruciata* Ell., Bot. S. C. and Ga. 1: 176. 1816. Presumably South Carolina.
- Eleusine mucronata* Hornem., Hort. Hafn. Sup. 116. 1819. Not *E. mucronata* Michx., 1803. Based on *Dactyloctenium mucronatum* Willd.
- Dactyloctenium meridionale* Hamilt., Prodr. Pl. Ind. Occ. 6. 1825. West Indies and tropical America.
- Cynosurus carolinianus* Willd. ex Steud., Nom. Bot. ed. 2. 1: 465. 1840. Name only, referred to *Dactyloctenium*.
- Dactyloctenium mucronatum* var. *erectum* Fourn., Mex. Pl. 2: 144. 1886. Mexico, Gouin 68; Karwinsky 989, 989b.
- (66) **DANTHONIA** Lam. and DC.
- (6) ***Danthonia californica*** Boland., Calif. Acad. Sci. Proc. 2: 182. 1863. Oakland and San Francisco, Calif., Bolander.
- Merathrepta californica* Piper, U. S. Natl. Herb. Contrib. 11: 122. 1906. Based on *Danthonia californica* Boland.
- Pentameris californica* Nels. and Macbr., Bot. Gaz. 56: 469. 1913. Based on *Danthonia californica* Boland.
- DANTHONIA CALIFORNICA** var. **AMERICANA** (Scribn.) Hitchc., Biol. Soc. Wash. Proc. 41: 160. 1928. Based on *D. americana* Scribn. (Published as *D. californica americana*.)
- Danthonia grandiflora* Phil., An. Univ. Chile 48: 568. 1873. Not *D. grandiflora* Hochst., 1851. Province Nuble, Chile.
- Danthonia americana* Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 30: 5. 1901. Based on *D. grandiflora* Phil.
- Merathrepta americana* Piper, U. S. Natl. Herb. Contrib. 11: 123. 1906.
- Based on *Danthonia americana* Scribn.
- Pentameris americana* Nels. and Macbr., Bot. Gaz. 56: 469. 1913. Based on *Danthonia americana* Scribn.
- Danthonia macounii* Hitchc., Amer. Jour. Bot. 2: 305. 1915. Nanaimo, Vancouver Island, Macoun 78825.
- Danthonia californica* var. *palousensis* St. John, Fl. Southeast. Wash. and Adj. Idaho 38. 1937. Potlatch, Idaho, Beattie 4061.
- Danthonia californica* var. *piperi* St. John, Fl. Southeast. Wash. and Adj. Idaho 38. 1937. Pullman, Wash., Piper 1744.
- (2) ***Danthonia compressa*** Austin in Peck, N. Y. State Mus. Ann. Rpt. 22: 54. 1869. Herkimer County, N. Y., Austin in 1868.
- Danthonia spicata* var. *compressa* Wood, Amer. Bot. and Flor. pt. 2: 396. 1871. Based on *D. compressa* Austin.
- Danthonia alleni* Austin, Torrey Bot. Club Bul. 3: 21. 1872. Rockaway, Long Island, Allen.
- Danthonia faxoni* Austin, Torrey Bot. Club Bul. 6: 190. 1877. White Mountains, N. H., Faxon in 1877.
- Merathrepta compressa* Heller, Muhlenbergia 5: 120. 1909. Based on *Danthonia compressa* Austin.
- Pentameris compressa* Nels. and Macbr., Bot. Gaz. 56: 469. 1913. Based on *Danthonia compressa* Austin.
- (4) ***Danthonia intermedia*** Vasey, Torrey Bot. Club Bul. 10: 52. 1883. California; Rocky Mountains; Plains of British America to Mount Albert, Quebec, Allen [in 1881, type].
- Danthonia intermedia* var. *cusickii* Williams, U. S. Dept. Agr., Div. Agrost. Cir. 30: 7. 1901. Oregon, Cusick 2427.
- Merathrepta intermedia* Piper, U. S. Natl. Herb. Contrib. 11: 122. 1906. Based on *Danthonia intermedia* Vasey.
- Merathrepta intermedia cusickii* Piper, U. S. Natl. Herb. Contrib. 11: 122. 1906. Based on *Danthonia intermedia cusickii* Williams.
- Pentameris intermedia* Nels. and Macbr., Bot. Gaz. 56: 470. 1913. Based on *Danthonia intermedia* Vasey.
- Danthonia cusickii* Hitchc., Amer. Jour. Bot. 2: 305. 1915. Based on *D. intermedia* var. *cusickii* Williams.
- (5) ***Danthonia parryi*** Scribn., Bot. Gaz. 21: 133. 1896. Colorado, Parry.
- Danthonia parryi* var. *longifolia* Scribn., Bot. Gaz. 21: 134. 1896. Twin Lakes, Colo., Wolf 1170.
- Merathrepta parryi* Heller, Muhlenbergia 5: 120. 1909. Based on *Danthonia parryi* Scribn.
- Danthonia pilosa*** R. Br., Prodr. Fl. Nov. Holl. 177. 1810. Australia.
- Danthonia semiannularis*** (Labill.) R. Br., Prodr. Fl. Nov. Holl. 177. 1810. Based on *Arundo semiannularis* Labill.

- Arundo semiannularis* Labill., Nov. Holl. Pl. 1: 26. pl. 33. 1804. Australia.
- (3) *Danthonia sericea* Nutt., Gen. Pl. 1: 71. 1818. Carolina to Florida.
- Danthonia glabra* Nash, Torrey Bot. Club Bul. 24: 43. 1897. Not *D. glabra* Phil., 1896. Little Stone Mountain, Ga., Small in 1895.
- Danthonia epilis* Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 30: 7. 1901. Based on *D. glabra* Nash.
- Merathrepta sericea* Heller, Muhlenbergia 5: 120. 1909. Based on *Danthonia sericea* Nutt.
- Pentameris epilis* Nels. and Macbr., Bot. Gaz. 56: 469. 1913. Based on *Danthonia epilis* Scribn.
- Pentameris sericea* Nels. and Macbr., Bot. Gaz. 56: 470. 1913. Based on *Danthonia sericea* Nutt.
- This is the species described by Elliott (Bot. S. C. and Ga. 1: 174. 1816) under the name *Avena spicata* L.
- (1) *Danthonia spicata* (L.) Beauv. ex Roem. and Schult., Syst. Veg. 2: 690. 1817. Based on *Avena spicata* L.
- Avena spicata* L., Sp. Pl. 80. 1753. Pennsylvania.
- Avena glumosa* Michx., Fl. Bor. Amer. 1: 72. 1803. Pennsylvania; Carolina, Michaux. (In Index Kewensis this name is erroneously credited to Ell. Elliott cited *A. glumosa* Michx. as synonym of *A. spicata* L.)
- Danthonia glumosa* Beauv., Ess. Agrost. 92, 153, 160. 1812. Based on *Avena glumosa* Michx.
- Avena spicaeformis* Beauv., Ess. Agrost. 154. 1812, name only; Roem. and Schult., Syst. Veg. 2: 690. 1817, as synonym of *Danthonia spicata* L.
- Triodia glumosa* Beauv., Ess. Agrost. Atlas 12. pl. 18. f. 7. 1812. Evidently an error for *Danthonia glumosa* Beauv.
- Merathrepta spicata* Raf. ex Jacks., Ind. Kew. 2: 211. 1894, as synonym of *Danthonia spicata*.
- Danthonia spicata* var. *villosa* Peck, N. Y. State Mus. Ann. Rpt. 47: 168. 1894. Brownville [Peck] and Taberg, N. Y.
- Danthonia spicata pinetorum* Piper, Erythraea 7: 103. 1899. Mason County, Wash., Piper 943.
- Danthonia thermale* Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 30: 5. 1901. Yellowstone Park, Wyo., A. Nelson and E. Nelson 6140.
- Danthonia spicata* var. *longipila* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 30: 7. 1901. Benton County, Ark., Plank 38.
- Merathrepta pinetorum* Piper, U. S. Natl. Herb. Contrib. 11: 122. 1906. Based on *Danthonia spicata pinetorum* Piper.
- Merathrepta thermale* Heller, Muhlenbergia 5: 120. 1909. Based on *Danthonia thermale* Scribn.
- Merathrepta thermale* var. *pinetorum* Piper ex Fedde and Schust., in Just's Bot. Jahresber. 37: 128. 1911 (erroneously ascribed to Heller, Muhlenbergia 5: 120. 1909).
- Pentameris spicata* Nels. and Macbr., Bot. Gaz. 56: 470. 1913. Based on *Avena spicata* L.
- Pentameris thermale* Nels. and Macbr., Bot. Gaz. 56: 470. 1913. Based on *Danthonia thermale* Scribn.
- Danthonia pinetorum* Piper in Piper and Beattie, Fl. Northw. Coast 46. 1915. Based on *D. spicata pinetorum* Piper.
- Danthonia spicata* var. *typica* Fernald, Rhodora 45: 242. 1943. Based on *Avena spicata* L.
- (7) *Danthonia unispicata* (Thurb.) Munro ex Macoun, Can. Pl. Cat. 24: 215. 1888. Based on *D. californica* var. *unispicata* Thurb. The name was earlier listed without description as follows: Thurb. in A. Gray, Proc. Acad. Phila., 1863: 78. 1863, name only, for Geyer 189. Thurb. in S. Wats., Bot. Calif. 2: 294. 1880, as synonym of *D. californica* var. *unispicata* Thurb. Munro; Vasey, Descr. Cat. Grasses U. S. 59. 1885. Name only.
- Danthonia californica* var. *unispicata* Thurb. in S. Wats., Bot. Calif. 2: 294. 1880. San Diego to San Francisco, Calif., Bolander, Parry, Lemmon.
- Merathrepta unispicata* Piper, U. S. Natl. Herb. Contrib. 11: 123. 1906. Based on *Danthonia unispicata* Munro.
- Pentameris unispicata* Nels. and Macbr., Bot. Gaz. 56: 470. 1913. Based on *Danthonia unispicata* Munro.

(58) DESCHAMPSIA Beauv.

- (4) *Deschampsia atropurpurea* (Wahl.) Scheele, Flora 27: 56. 1844. Based on *Aira atropurpurea* Wahl.
- Aira atropurpurea* Wahl., Fl. Lapp. 37. 1812. Lapland.
- Holcus atropurpureus* Wahl., Svensk Bot. pl. 687. 1826-29. Based on *Aira atropurpurea* Wahl.
- Avena atropurpurea* Link, Hort. Berol. 1: 119. 1827. Based on *Aira atropurpurea* Wahl.
- Aira latifolia* Hook., Fl. Bor. Amer. 2: 243. pl. 227. 1840. Rocky Mountains, Drummond.
- Vahlodea atropurpurea* Fries, Bot. Not. 178. 1842. Presumably based on *Aira atropurpurea* Wahl.
- Deschampsia latifolia* Vasey, Grasses U. S. 29. 1883. Not *D. latifolia* Hochst., 1851. Based on *Aira latifolia* Hook.
- Deschampsia hookeriana* Scribn., Bot. Gaz. 11: 97. 1886. Based on *Aira latifolia* Hook.
- Deschampsia atropurpurea* var. *minor* Vasey, Torrey Bot. Club Bul. 15: 48.

1888. Vancouver Island, *Macoun* in 1887.
- Deschampsia atropurpurea* var. *latifolia* Scribn. ex Macoun, Cat. Can. Pl. 24: 209. 1888. Based on *Aira latifolia* Hook.
- Vahlodea latifolia* Hultén, Fl. Aleut. Isl. 83. 1937. Based on *Aira latifolia* Hook.
- (6) *Deschampsia caespitosa* (L.) Beauv., Ess. Agrost. 91, 149, 160. pl. 18. f. 3. 1812. Based on *Aira caespitosa* L.
- Aira caespitosa* L., Sp. Pl. 64. 1753. Europe.
- Agrostis caespitosa* Salisb., Prodr. Stirp. 25. 1796. Based on *Aira caespitosa* L.
- Aira ambigua* Michx., Fl. Bor. Amer. 1: 61. 1803. Canada, *Michaux*.
- Aira caespitosa* var. *ambigua* Pursh, Fl. Amer. Sept. 1: 77. 1814. Based on *A. ambigua* Michx.
- Aira caespitosa* Muhl., Descr. Gram. 85. 1817. Pennsylvania; New England.
- Aira aristulata* Torr., Fl. North. and Mid. U. S. 1: 132. 1823. New York, *Cooper*.
- Campbellia caespitosa* Link, Hort. Berol. 1: 122. 1827. Based on *Aira caespitosa* L.
- Aira caespitosa* var. *genuina* Reichenb., Icon. 1: pl. 96. f. 1682. 1834. Based on *A. caespitosa* L.
- Podionapus caespitosus* Dulac, Fl. Haut. Pyr. 82. 1867. Based on *Deschampsia caespitosa* Beauv.
- Avena caespitosa* Kuntze, Taschenfl. Leipzig 45. 1867. Based on *Aira caespitosa* L.
- Aira major* subsp. *caespitosa* Syme in Sowerby, English Bot. ed. 3. 11: 64. 1873. Based on *A. caespitosa* L.
- Aira caespitosa* var. *montana* Vasey in Rothr. in Wheeler, U. S. Survey, W. 100th Merid. Rpt. 6: 294. 1878. Not *A. caespitosa* var. *montana* Reichenb., 1850. Utah, Colorado, and Arizona.
- Deschampsia caespitosa* var. *maritima* Vasey, Torrey Bot. Club Bul. 15: 48. 1888. Vancouver Island, *Macoun* in 1887.
- Deschampsia ambigua* Beauv. ex Jacks., Ind. Kew. 1: 735. 1893. Name only, presumably referring to *Aira ambigua* Michx.
- Deschampsia caespitosa* var. *alpina* Vasey ex Beal, Grasses N. Amer. 2: 368. 1896. Not *D. caespitosa* var. *alpina* Ducomm., 1869. Alaska, *Elliott*; Colorado, *Letterman*.
- Deschampsia caespitosa* var. *confinis* Vasey ex Beal, Grasses N. Amer. 2: 369. 1896. Southern California, *Palmer* 231 in 1888.
- Deschampsia caespitosa* var. *longiflora* Beal, Grasses N. Amer. 2: 369. 1896. Vancouver Island, *Macoun* in 1887.
- Deschampsia alpicola* Rydb., Torrey Bot. Club Bul. 32: 601. 1905. Based on *D. caespitosa* var. *alpina* Vasey.
- Deschampsia confinis* Rydb., Torrey Bot. Club Bul. 36: 533. 1909. Based on *D. caespitosa* var. *confinis* Vasey.
- Deschampsia pungens* Rydb., Torrey Bot. Club Bul. 39: 103. 1912. Banff, Alberta, *McCalla* 2309.
- Deschampsia caespitosa* var. *genuina* Volk, Bot. Jahrb. 47: 312. 1912. Based on *Aira caespitosa* var. *genuina* Reichenb.
- Aira alpicola* Rydb., Fl. Rocky Mount. ed. 2. 1112. 1922. Based on *Deschampsia alpicola* Rydb.
- Deschampsia caespitosa* subsp. *genuina* W. E. Lawr., Amer. Jour. Bot. 32: 302. 1945. Based on *Aira caespitosa* var. *genuina* Reichenb.
- The following names based on *Deschampsia brevifolia* R. Br. (Sup. App. Parry's Voy. 191. 1821) described from Melville Island, Arctic America, and not known from the United States, have been misapplied to *D. caespitosa* by various American authors:
- Aira arctica* Spreng., Syst. Veg. 4: Cur. Post. 32. 1827. Based on *Deschampsia brevifolia* R. Br.
- Aira caespitosa* var. *arctica* Thurb. ex A. Gray, Acad. Nat. Sci. Phila. Proc. 1863: 78. 1863. Based on *Deschampsia brevifolia* R. Br.
- Deschampsia brachyphylla* Nash in Rydb., N. Y. Bot. Gard. Mem. 1: 37. 1900. Not *D. brachyphylla* Phil., 1896. Based on *D. brevifolia* R. Br.
- Deschampsia curtifolia* Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 30: 7. 1901. Based on *D. brachyphylla* Nash.
- Deschampsia arctica* Merr., Rhodora 4: 143. 1902. Based on *Aira arctica* Spreng.
- Aira curtifolia* Rydb., Fl. Rocky Mount. ed. 2. 1112. 1922. Based on *Deschampsia curtifolia* Scribn.
- Other names based on Old World species were misapplied to *Deschampsia caespitosa* by Beal:
- Deschampsia caespitosa* var. *bottnica* Vasey ex Beal, Grasses N. Amer. 2: 369. 1896. Based on *Aira bottnica* Wahl.
- Deschampsia caespitosa* var. *brevifolia* Vasey ex Beal, Grasses N. Amer. 2: 369. 1896. Based on *Aira brevifolia* Bieb.
- Deschampsia caespitosa* var. *montana* Vasey ex Beal, Grasses N. Amer. 2: 369. 1896. Based on *D. montana* Schur.
- The following names applied to various collections of *D. caespitosa* are based on European types. Some of these collections agree fairly well, some do not, with European specimens distributed under these names:
- Deschampsia caespitosa* var. *glauca* (Hartm.) Lindm., Svensk. Fanerogampl. 81. 1918. Not *D. caespitosa* var. *glauca* Regel, 1881. Based on *D. glauca* Hartm.
- Deschampsia glauca* Hartm., Handb. Skand. Fl. 448. 1820.

- Deschampsia caespitosa* var. *littoralis* (Gaudin) Richt., Pl. Eur. 1: 56. 1890. Based on *Aira caespitosa* var. *littoralis* Gaudin, 1828.
- DESCHAMPSIA CAESPITOSA var. PARVIFLORA (Thuill.) Coss. and Germ., Fl. Env. Paris ed. 2. 806. 1861. Based on *Aira parviflora* Thuill.
- Aira parviflora* Thuill., Fl. Env. Paris ed. 2. 1: 38. 1799. Paris.
- (3) *Deschampsia congestiformis* Booth, Rhodora 45: 414. 1943. Gallatin Valley, Bozeman, Mont., *Hawkins* in 1903.
- (1) *Deschampsia danthonioides* (Trin.) Munro ex Benth., Pl. Hartw. 342. 1857. Based on *Aira danthonioides* Trin. *Aira danthonioides* Trin., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 1: 57. 1830. Western North America.
- Deschampsia calycina* Presl, Rel. Haenk. 1: 251. 1830. "Peru" is the published locality, but the type specimen is labeled Monterey, Calif., *Haenke*.
- Aira calycina* Steud., Syn. Pl. Glum. 1: 220. 1854. Based on *Deschampsia calycina* Presl.
- Trisetum glabrum* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 100. 1862. "Texas *Dr. Linsecum*." [Locality probably erroneous, the plants bearing this ticket in the herbarium of the Academy of Sciences, Philadelphia, being very like two on the same sheet labeled "Rocky Mountains of Columbia, *Nuttall*." The species is not otherwise known east of Arizona.]
- Deschampsia gracilis* Vasey, Bot. Gaz. 10: 224. 1885. San Diego, Calif., *Orcutt* [1072].
- Deschampsia danthonioides* var. *gracilis* Munz, Man. South Calif. Bot. 45: 597. 1935. Based on *Deschampsia gracilis* Vasey.
- (2) *Deschampsia elongata* (Hook.) Munro ex Benth., Pl. Hartw. 342. 1857. Based on *Aira elongata* Hook.
- Aira elongata* Hook., Fl. Bor. Amer. 2: 243. pl. 228. 1840. Columbia River, *Douglas*.
- Deschampsia elongata* var. *ciliata* Vasey ex Beal, Grasses N. Amer. 2: 371. 1896. Oregon, *Howell*; California, *Anderson* [Santa Cruz, type].
- Deschampsia elongata* var. *tenuis* Vasey ex Beal, Grasses N. Amer. 2: 372. 1896. Santa Cruz, Calif., *Jones* 2201. Published as new in *Jepson*, Fl. West. Mid. Calif. 51. 1901. Evergreen, Santa Clara County, Calif.
- Deschampsia ciliata* Rydb., Fl. Rocky Mount. 60. 1917. Based on *D. elongata* var. *ciliata* Vasey.
- Aira vaseyana* Rydb., Fl. Rocky Mount. ed. 2. 1112. 1922. Based on *Deschampsia elongata* var. *ciliata* Vasey.
- (5) *Deschampsia flexuosa* (L.) Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 2¹: 9. 1836. Based on *Aira flexuosa* L.
- Aira flexuosa* L., Sp. Pl. 65. 1753. Europe.
- Avena flexuosa* Mert. and Koch in Roehl, Deut. Fl. ed. 3. 1²: 570. 1823. Based on *Aira flexuosa* L.
- Avenella flexuosa* Parl., Fl. Ital. 1: 246. 1848. Based on *Aira flexuosa* L.
- Lerchenfeldia flexuosa* Schur, Enum. Pl. Transsilyv. 753. 1866. Based on *Aira flexuosa* L.
- Podionapus flexuosus* Dulac, Fl. Haut. Pyr. 83. 1867. Based on *Deschampsia flexuosa* Trin.
- Salmasia flexuosa* Bubani, Fl. Pyr. 4: 319. 1901. Based on *Aira flexuosa* L.
- (7) *Deschampsia holciformis* Presl, Rel. Haenk. 1: 251. 1830. Monterey, Calif., *Haenke*.
- Aira holciformis* Steud., Syn. Pl. Glum. 1: 221. 1854. Based on *Deschampsia holciformis* Presl.
- Deschampsia caespitosa* subsp. *holciformis* W. E. Lawr., Amer. Jour. Bot. 32: 302. 1945. Based on *D. holciformis* Presl.
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- Desmazeria sicula** (Jacq.) Dum., Comm. Bot. 27. 1822. Based on *Cynosurus siculus* Jacq. The generic name spelled *Demazeria*; later (Obs. Gram. Be g. 46. 1823) corrected to *Desmazeria* by Dumortier.
- Cynosurus siculus* Jacq., Obs. Bot. 2: 22. pl. 43. 1767. Europe.
- (17) **DIARRHENA** Beauv.
- (1) **Diarrhena americana** Beauv., Ess. Agrost. 142. pl. 25. f. 2. 1812. Based on *Festuca diandra* Michx.
- Festuca diandra* Michx., Fl. Bor. Amer. 1: 67. 1803. Not *F. diandra* Moench., 1794. "Kentucky, Tennessee, etc." *Michaux*.
- Diarina festucoides* Raf., Med. Repos. N. Y. 5: 352. 1808. Not *Diarrhena festucoides* Raspail, 1825. Based on *Festuca diandra* Michx.
- Festuca americana* Michx. ex Beauv., Ess. Agrost. 162. 1812. Name only.
- Korycarpus arundinaceus* Zea ex Lag., Gen. et Sp. Nov. 4. 1816. America.
- Roemeria zea* Roem. and Schult., Syst. Veg. 1: 61, 287. 1817. Source unknown.
- Diarina sylvatica* Raf., Jour. Phys. Chym. 89: 104. 1819. Based on *Festuca diandra* Michx.
- Diarrhena diandra* Wood, Class-book ed. 2. 612. 1847. Based on *Festuca diandra* Michx.
- Corycarpus diandrus* Kuntze, Rev. Gen. Pl. 2: 772. 1891. Based on *Festuca diandra* Michx.
- Diarrhena festucoides* Fernald, Rhodora 34: 204. 1932. Not *D. festucoides* Ras-

pail, 1825. Based on *Diarina festucoides* Raf.

Diarrhena arundinacea Rydb., Fl. Prairie and Plains Centr. N. Amer. 114. 1932. Based on *Korycarpus arundinaceus* Zea.

(129) DIGITARIA Heister

(17) *Digitaria albicoma* Swallen, Wash. Acad. Sci. Jour. 30: 214. f. 3. 1940. Brooksville, Fla., Swallen 5644.

Digitaria decumbens Stent, Bothalia 3: 150. 1930. Transvaal, South Africa, Pentz, Nat. Herb. Pretoria 8485.

(11) *Digitaria dolichophylla* Henr., Blumea 1: 94. 1934. Florida, A. A. Eaton 459.

(9) *Digitaria filiformis* (L.) Koel., Descr. Gram. 26. 1802. Based on *Panicum filiforme* L.

Panicum filiforme L., Sp. Pl. 57. 1753. North America, Kalm.

Paspalum filiforme Flügge, Monogr. Pasp. 139. 1810. Not *P. filiforme* Swartz, 1788. Based on *Panicum filiforme* L.

Paspalum furcatum var. *filiforme* Doell in Mart., Fl. Bras. 2^o: 104. 1877. Based on *Digitaria filiformis* Muhl. (the same as Flügge) but misapplied to a species of *Axonopus*.

Syntherisma filiformis Nash, Torrey Bot. Club Bul. 22: 420. 1895. Based on *Panicum filiforme* L.

Digitaria laeviglumis Fernald, Rhodora 22: 102. 1920. Manchester, N. H., Batchelder.

(4) *Digitaria floridana* Hitchc., Biol. Soc. Wash. Proc. 41: 163. 1928. Hernando County, Fla., Hitchcock Fla. Pl. 2517.

Syntherisma floridanum Hitchc. in Small, Man. Southeast. Fl. 51. 1933. Hernando County, Fla.

(12) *Digitaria gracillima* (Scribn.) Fernald, Rhodora 22: 101. 1920. Based on *Panicum gracillimum* Scribn.

Panicum gracillimum Scribn., Torrey Bot. Club Bul. 23: 146. 1896. Eustis, Fla., Nash 1192.

Syntherisma gracillima Nash, Torrey Bot. Club Bul. 25: 295. 1898. Based on *Panicum gracillimum* Scribn.

Syntherisma bakeri Nash, Torrey Bot. Club Bul. 25: 296. 1898. Grasmere, Fla., C. H. Baker 47.

Digitaria bakeri Fernald, Rhodora 22: 102. 1920. Based on *Syntherisma bakeri* Nash.

(2) *Digitaria horizontalis* Willd., Enum. Pl. 92. 1809. Dominican Republic.

Milium digitatum Swartz, Prodr. Veg. Ind. Occ. 24. 1788. Not *Digitaria digitata* Buse, 1854. Jamaica.

Agrostis digitata Poir. in Lam., Encycl. Sup. 1: 258. 1810. Not *A. digitata* Lam., 1783. Based on *Milium digitatum* Swartz.

Axonopus digitatus Beauv., Ess. Agrost. 12, 154. 1812. Based on *Milium digi-*

tatum Swartz.

Panicum horizontale G. Meyer, Prim. Fl. Esseq. 54. 1818. Based on *Digitaria horizontalis* Willd.

Digitaria jamaicensis Spreng., Syst. Veg. 1: 272. 1825. Jamaica.

Digitaria setosa Desv. ex Hamilt., Prodr. Pl. Ind. Occ. 6. 1825. West Indies.

Paspalum digitatum Kunth, Rév. Gram. 1: 24. 1829. Based on *Milium digitatum* Swartz.

Panicum hamiltonii Kunth, Rév. Gram. 1: Sup. 9. 1830. Based on *Digitaria setosa* Desv.

Syntherisma setosum Nash, Torrey Bot. Club Bul. 25: 300. 1898. Based on *Digitaria setosa* Desv.

Digitaria sanguinalis var. *horizontalis* Rendle, Cat. Afr. Pl. Welw. 2: 163. 1899. Based on *D. horizontalis* Willd.

Panicum sanguinale var. *digitatum* Hack. ex Urban, Symb. Antill. 4: 86. 1903. Based on *Milium digitatum* Swartz.

Panicum sanguinale subsp. *horizontale* Hack., Ergeb. Bot. Exped. Akad. Wiss. Südbres. 8. 1906; Denkschr. Akad. Wiss. Math. Naturw. (Wien) 79: 69. 1908. Based on *Digitaria horizontalis* Willd.

Syntherisma digitatum Hitchc., U. S. Natl. Herb. Contrib. 12: 142. 1908. Based on *Milium digitatum* Swartz.

Digitaria digitata Urban, Symb. Antill. 8: 24: 1920. Not *D. digitata* Buse, 1854. Based on *Milium digitatum* Swartz.

(3) *Digitaria ischaemum* (Schreb.) Schreb. ex Muhl., Descr. Gram. 131. 1817. Presumably based on *Panicum ischaemum* Schreb. Name only, Muhl., Cat. Pl. 9. 1813.

Panicum ischaemum Schreb. in Schweigger, Spec. Fl. Erland. 16. 1804. Germany.

Digitaria humifusa Pers., Syn. Pl. 1: 85. 1805. France.

Syntherisma glabrum Schrad., Fl. Germ. 1: 163. pl. 3. f. 6. 1806. Germany.

Panicum glabrum Gaudin, Agrost. Helv. 1: 22. 1811. Based on *Syntherisma glabrum* Schrad. (In Index Kewensis "Ell." is erroneously given as author of *P. glabrum*.)

Digitaria glabra Beauv., Ess. Agrost. 51. 1812. Presumably based on *Syntherisma glabrum* Schrad.

Paspalum humifusum Poir. in Lam., Encycl. Sup. 4: 316. 1816. Based on *Digitaria humifusa* Pers.

Panicum humifusum Kunth, Rév. Gram. 1: 33. 1829. Based on *Digitaria humifusa* Pers.

Panicum phaeocarpum var. *drummondianum* Nees, Fl. Afr. Austr. 22. 1841. St. Louis, Mo., Drummond.

Paspalum glabrum Wood, Amer. Bot. and Flor. pt. 2: 390. 1871. Not *P. glabrum* Poir., 1804. "(Gaud.)," given in paren-

- theses by Wood, doubtless refers to *Panicum glabrum* Gaudin.
- Paspalum glabrum* Cassidy, Colo. Agr. Expt. Sta. Bul. 12: 91. 1890. Not *P. glabrum* Poir., 1804. Colorado.
- Syntherisma humifusum* Rydb., N. Y. Bot. Gard. Mem. 1: 469. 1900. Based on *Digitaria humifusa* Pers.
- Syntherisma ischaemum* Nash, N. Amer. Fl. 17: 151. 1912. Based on *Panicum ischaemum* Schreb.
- The name *Panicum lineare* L. (*Syntherisma lineare* Nash) has been used for *Digitaria ischaemum*, but the description does not apply (e.g. "calycis squama exterior brevior, patens, rachi adhaerens"). It is probably *Cynodon dactylon*.
- DIGITARIA ISCHAEMUM** var. **MISSISSIPPIENSIS** (Gattinger) Fernald, Rhodora 22: 103. 1920. Based on *Panicum glabrum* var. *mississippiense* Gattinger.
- Panicum glabrum* var. *mississippiense* Gattinger, Tenn. Fl. 95. 1887, name only, Nashville. Scribn., Tenn. Agr. Expt. Sta. Bul. 7: 39. 1894. Knoxville, Tenn.
- Panicum lineare* var. *mississippiense* Gattinger ex Beal, Grasses N. Amer. 2: 111. 1896. Presumably based on *P. glabrum* var. *mississippiense* Gattinger.
- Syntherisma linearis mississippiensis* Nash, Torrey Bot. Club. Bul. 25: 300. 1898. Based on *Panicum glabrum* var. *mississippiense* Gattinger.
- (7) **Digitaria longiflora** (Retz.) Pers., Syn. Pl. 1: 85. 1805. Based on *Paspalum longiflorum* Retz.
- Paspalum longiflorum* Retz., Obs. Bot. 4: 15. 1786. India.
- Panicum longiflorum* Gmel., Syst. Nat. 2: 158. 1791. Presumably based on *Paspalum longiflorum* Retz.
- Syntherisma longiflora* Skeels, U. S. Dept. Agr., Bur. Plant Indus. Bul. 261: 30. 1912. Based on *Paspalum longiflorum* Retz.
- (15) **Digitaria pauciflora** Hitchc., Biol. Soc. Wash. Proc. 41: 162. 1928. Southern Florida, Eaton 207.
- Syntherisma pauciflorum* Hitchc. in Small, Man. Southeast. Fl. 51. 1933. Southern Florida. [Eaton 207.]
- Digitaria pentzii** Stent, Bothalia 3: 147. 1930. Cape Province, South Africa. Pentz 8510.
- (14) **Digitaria runyoni** Hitchc., Wash. Acad. Sci. Jour. 23: 455. 1933. Mouth of Rio Grande, near Brownsville, Tex., Runyon 188.
- (1) **Digitaria sanguinalis** (L.) Scop., Fl. Carn. ed. 2. 1: 52. 1772. Based on *Panicum sanguinale* L.
- Panicum sanguinale* L., Sp. Pl. 57. 1753. America and southern Europe.
- Dactylon sanguinalis* Vill., Hist. Pl. Dauph. 2: 69. 1787. Based on *Panicum sanguinale* L.
- Syntherisma praecox* Walt., Fl. Carol. 76. 1788. South Carolina.
- Paspalum sanguinale* Lam., Tabl. Encycl. 1: 176. 1791. Based on *Panicum sanguinale* L.
- Digitaria praecox* Willd., Enum. Pl. 91. 1809. Based on *Syntherisma praecox* Walt.
- Panicum adscendens* H. B. K., Nov. Gen. et Sp. 1: 97. 1815. Venezuela, Peru, and Mexico, Humboldt and Bonpland.
- Cynodon praecox* Roem. and Schult., Syst. Veg. 2: 412. 1817. Based on *Syntherisma praecox* Walt.
- Digitaria marginata* Link, Enum. Pl. 1: 102. 1821. Brazil.
- Digitaria fimbriata* Link, Hort. Berol. 1: 226. 1827. Brazil.
- Panicum fimbriatum* Kunth, Rév. Gram. 1: 33. 1829. Based on *Digitaria fimbriata* Link.
- Panicum linkianum* Kunth, Rév. Gram. 1: 33. 1829. Based on *Digitaria marginata* Link.
- Syntherisma sanguinalis* Dulac, Fl. Haut. Pyr. 77. 1867. Based on *Panicum sanguinale* L.
- Syntherisma fimbriatum* Nash, Torrey Bot. Club Bul. 25: 302. 1898. Based on *Digitaria fimbriata* Link.
- Syntherisma marginatum* Nash, N. Amer. Fl. 17: 154. 1912. Based on *Digitaria marginata* Link.
- Digitaria marginata* var. *fimbriata* Stapf in Prain, Fl. Trop. Afr. 9: 440. 1919. Based on *D. fimbriata* Link.
- Panicum sanguinale* subsp. *marginatum* Thell., Vierteljahrs. Nat. Ges. Zürich 64: 699. 1919. Based on *Digitaria marginata* Link.
- Digitaria sanguinalis* var. *marginata* Fernald, Rhodora 22: 103. 1920. Based on *D. marginata* Link.
- Digitaria adscendens* Henr., Blumea 1: 92. 1934. Based on *Panicum adscendens* H. B. K.
- Digitaria nealleyi* Henr., Blumea 1: 94. 1934. Texas, Nealley in 1884. A duplicate of the type in the National Herbarium is distorted by a fungus. Described as *Syntherisma barbata* (Willd.) Nash in Small's Flora.
- DIGITARIA SANGUINALIS** var. **CILIARIS** (Retz.) Parl., Fl. Ital. 1: 126. 1848. Based on *Panicum ciliare* Retz.
- Panicum ciliare* Retz., Obs. Bot. 4: 16. 1786. Asia.
- Digitaria sanguinalis* subsp. *ciliaris* Domin, Preslia 13/15: 47. 1935. Based on *Panicum ciliare* Retz.
- (6) **Digitaria serotina** (Walt.) Michx., Fl. Bor. Amer. 1: 46. 1803. Based on *Syntherisma serotinum* Walt.
- Syntherisma serotinum* Walt., Fl. Carol. 76. 1788. South Carolina.
- Paspalum serotinum* Flüge, Monogr. Pasp. 145. 1810. Based on *Digitaria serotina* Michx.

- (8) *Digitaria simpsoni* (Vasey) Fernald, *Rhodora* 22: 103. 1920. Based on *Panicum sanguinale* var. *simpsoni* Vasey.
Panicum sanguinale var. *simpsoni* Vasey, U. S. Natl. Herb. Contrib. 3: 25. 1892. Manatee, Fla., *Simpson*.
Panicum simpsoni Beal, *Grasses N. Amer.* 2: 109. 1896. Based on *Panicum sanguinale* var. *simpsoni* Vasey.
Syntherisma simpsoni Nash, *Torrey Bot. Club Bul.* 25: 297. 1898. Based on *Panicum sanguinale* var. *simpsoni* Vasey.
- Digitaria swazilandensis* Stent, *Bothalia* 3: 156. 1930. Swaziland, Africa.
- (16) *Digitaria subcalva* Hitchc., *Amer. Jour. Bot.* 21: 138. f. 4. 1934. Plant City, Fla., *C. P. Wright*.
- (13) *Digitaria texana* Hitchc., *Biol. Soc. Wash. Proc.* 41: 162. 1928. Sarita, Tex., *Hitchcock* 5479.
- (10) *Digitaria villosa* (Walt.) Pers., *Syn. Pl.* 1: 85. 1805. Based on *Syntherisma villosa* Walt.
Syntherisma villosa Walt., *Fl. Carol.* 77. 1788. South Carolina.
Digitaria pilosa Michx., *Fl. Bor. Amer.* 1: 45. 1803. Carolina and Georgia, *Michaux*. Willdenow (*Enum. Pl.* 1: 91. 1809) uses this name, doubtfully citing *D. pilosa* Michx. The description suggests that Willdenow's plant, from Carolina, is also *D. villosa*.
Paspalum carolinianum Poir. in *Lam., Encycl. Sup.* 4: 311. 1816. Carolina and Georgia, *Bosc*.
Syntherisma leucocoma Nash, *Torrey Bot. Club Bul.* 25: 295. 1898. Lake Ella, Fla., *Nash* 1155.
Panicum leucocomum Scribn., U. S. Dept. Agr., *Div. Agrost. Bul.* 7. (ed. 2): 58. 1898. Based on *Syntherisma leucocoma* Nash.
Digitaria leucocoma Urban, *Symb. Antill.* 8: 24. 1920. Based on *Syntherisma leucocoma* Nash.
Digitaria filiformis var. *villosa* Fernald, *Rhodora* 36: 19. 1934. Based on *Syntherisma villosa* Walt.
- (5) *Digitaria violascens* Link, *Hort. Berol.* 1: 229. 1827. Brazil.
Panicum violascens Kunth, *Rév. Gram.* 1: 33. 1829. Based on *Digitaria violascens* Link.
Paspalum chinense Nees in *Hook. and Arn., Bot. Beechey Voy.* 231. 1836. Macao, China.
Syntherisma chinensis Hitchc., U. S. Natl. Herb. Contrib. 22: 468. 1922. Based on *Paspalum chinense* Nees.
Digitaria chinensis A. Camus, *Not. Syst. Lecomte* 4: 48. 1923. Not *D. chinensis* Hornem., 1819. Based on *Paspalum chinense* Nees.

(18) DISSANTHELIUM Trin.

- (1) *Dissanthelium californicum* (Nutt.) Benth. in *Hook. f., Icon. Pl. III.* 4: 56. pl. 1375. 1881. Based on *Stenochloa californica* Nutt.
Stenochloa californica Nutt., *Jour. Acad. Sci. Phila. II.* 1: 189. 1848. Santa Catalina Island, Calif., *Gambel*.

(21) DISTICHLIS Raf.

- (1) *Distichlis spicata* (L.) Greene, *Calif. Acad. Sci. Bul.* 2: 415. 1887. Based on *Uniola spicata* L.
Uniola spicata L., *Sp. Pl.* 71. 1753. Atlantic coast of North America.
Briza spicata Lam., *Encycl.* 1: 465. 1785. Based on *Uniola spicata* L.
?Festuca multiflora Walt., *Fl. Carol.* 81. 1788. South Carolina.
Festuca triticoides Lam., *Tabl. Encycl.* 1: 191. 1791. Carolina, *Fraser*.
Festuca distichophylla Michx., *Fl. Bor. Amer.* 1: 67. 1803. Carolina, *Michaux*.
Uniola distichophylla Roem. and Schult., *Syst. Veg.* 2: 596. 1817. Based on *Festuca distichophylla* Michx.
Distichlis maritima Raf., *Jour. Phys. Chym.* 89: 104. 1819. Based on *Uniola spicata* L.
Distichlis nodosa Raf., *Jour. Phys. Chym.* 89: 104. 1819. Based on *Festuca distichophylla* Michx.
Brizopyrum americanum Link, *Hort. Berol.* 1: 160. 1827. Based on *Uniola spicata* L.
Poa michauxii Kunth, *Rév. Gram.* 1: 111. 1829. Based on *Festuca distichophylla* Michx.
Brizopyrum boreale Presl, *Rel. Haenk.* 1: 280. 1830. Nootka Sound, Vancouver Island, *Haenke*.
Poa borealis Kunth, *Rév. Gram.* 1: Sup. 28. 1830. Based on *Brizopyrum boreale* Presl.
Festuca triticea Lam. ex Kunth, *Enum. Pl.* 1: 325. 1833, as synonym of *Poa michauxii* Kunth. (Probably error for *F. triticoides* Lam.)
Brizopyrum spicatum Hook. and Arn., *Bot. Beechey Voy.* 403. 1841. Based on *Uniola spicata* L.
Distichlis spicata var. *borealis* Beetle, *Torrey Bot. Club Bul.* 70: 643. f. 1. 1943. Based on *Brizopyrum boreale* Presl.
Distichlis spicata var. *stolonifera* Beetle, *Torrey Bot. Club Bul.* 70: 644. f. 4, 7, 12. 1943. Ferndale, Humboldt County, Calif., *Davy* and *Blasdale* 6202 (pistillate); Arcata, Humboldt County, Calif., *Davy* and *Blasdale* 5604 (staminate).
Distichlis spicata var. *divaricata* Beetle, *Torrey Bot. Club Bul.* 70: 647. f. 10. 1943. Salton, Calif., *Davy* in 1902.
Distichlis spicata var. *distichophylla* Beetle, *Rhodora* 47: 148. 1945. Based on

- Uniola distichophylla* Roem. and Schult., this based on *Festuca distichophylla* Michx.
- DISTICHLIS SPICATA** var. **NANA** Beetle, Torrey Bot. Club Bul. 70: 647. f. 3, 9. 1943. Whitaker Forest, Tulare County, Calif., Kennedy in 1928.
- (2) **Distichlis stricta** (Torr.) Rydb., Torrey Bot. Club Bul. 32: 602. 1905. Based on *Uniola stricta* Torr.
- Festuca spicata* Nutt., Gen. Pl. 1: 72. 1818. Not *F. spicata* Pursh, 1814. "On the banks of the Missouri."
- Uniola stricta* Torr., Ann. Lyc. N. Y. 1: 155. 1824. Canadian River [Okla.].
- Uniola multiflora* Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 148. 1837. Arkansas River, Nuttall.
- Uniola flexuosa* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 99. 1862. Fort Belknap, Tex., Buckley.
- Brizopyrum spicatum* var. *strictum* A. Gray ex S. Wats., in King, Geol. Expl. 40th Par. 5: 385. 1871. Based on *Uniola stricta* Torr.
- Distichlis maritima* var. *stricta* Thurb., in S. Wats., Bot. Calif. 2: 306. 1880. Based on *Uniola stricta* Torr.
- Distichlis spicata stricta* Scribn., Torrey Bot. Club Mem. 5: 51. 1894. Based on *Uniola stricta* Torr.
- Distichlis spicata* var. *laxa* Vasey ex Beal, Grasses N. Amer. 2: 519. 1896. Lake Park, Utah, Tracy in 1887.
- Distichlis dentata* Rydb., Torrey Bot. Club Bul. 36: 536. 1909. Washington, Sandberg and Leiberg 463. (Pistillate plant.)
- Distichlis stricta* var. *laxa* Fawcett and West ex Munz, Man. South. Calif. Bot. 52, 597. 1935. Based on *D. spicata* var. *laxa* Vasey.
- Distichlis spicata* var. *stricta* Beetle, Torrey Bot. Club Bul. 70: 645. f. 2, 6, 11, 13. 1943. Based on "*Brizopyrum spicatum* var. *strictum* A. Gray; S. Wats.," this based on *Uniola stricta* Torr.
- (3) **Distichlis texana** (Vasey) Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 16: 2. 1899. Based on *Poa texana* Vasey.
- Poa texana* Vasey, U. S. Natl. Herb. Contrib. 1: 60. 1890. Region of Rio Grande, Tex., Nealley.
- Sieglingia wrightii* Vasey, U. S. Natl. Herb. Contrib. 1: 269. 1893. Valley of the Limpio, Tex., Wright 2038.
- Oplismenus colonum* H. B. K., Nov. Gen. et Sp. 1: 108. 1815. Based on *Panicum colonum* L.
- Panicum zonale* Guss., Fl. Sic. Prodr. 1: 62. 1827. Sicily.
- Oplismenus repens* Presl, Rel. Haenk. 1: 321. 1830. Mexico, Haenke.
- Oplismenus colonum* var. *zonalis* Schrad., Linnaea 12: 429. 1838. Based on *Panicum zonale* Guss.
- Panicum incertum* Bosc ex Steud., Nom. Bot. ed. 2: 2: 258. 1841. Name only. Carolina.
- Echinochloa zonalis* Parl., Fl. Panorm. 1: 119. 1845. Based on *Panicum zonale* Guss.
- Panicum prorepens* Steud., Syn. Pl. Glum. 1: 46. 1854. Based on *Oplismenus repens* Presl.
- Oplismenus crusgalli* var. *colonum* Coss. and Dur., Expl. Sci. Alger. 2: 28. 1854. Based on *Panicum colonum* L.
- Panicum colonum* var. *zonale* L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 502. 1894. Based on *P. zonale* Guss.
- Echinochloa colonum* var. *zonalis* Woot. and Standl., N. Mex. Col. Agr. Bul. 81: 45. 1912. Based on *Panicum zonale* Guss.
- Echinochloa crusgalli* subsp. *colonum* Honda, Bot. Mag. [Tokyo] 37: 122. 1923. Based on *Panicum colonum* L.
- Panicum crusgalli* subsp. *colonum* Makino and Nemoto, Fl. Jap. 1470. 1925. Based on *P. colonum* L.
- (3) **Echinochloa crusgalli** (L.) Beauv., Ess. Agrost. 53, 161. 1812. Based on *Panicum crusgalli* L.
- Panicum crusgalli* L., Sp. Pl. 56. 1753. Europe; Virginia.
- Milium crusgalli* Moench, Meth. Pl. 202. 1794. Based on *Panicum crusgalli* L.
- Panicum grossum* Salisb., Prod. Stirp. 18. 1796. Based on *P. crusgalli* L.
- Panicum muricatum* Michx., Fl. Bor. Amer. 1: 47. 1803. Not *P. muricatum* Retz., 1786. Canada, Lake Champlain [type] and Lake Ontario, Michaux.
- ?*Panicum echinatum* Willd., Enum. Pl. 1032. 1809. "America meridionali." Wiegand (Rhodora 23: 60. 1921) takes up this name for *Echinochloa crus-pavonis*. The specimen in the Willdenow Herbarium named *P. echinatum* (Magdalena, Colombia, Humboldt) is *Pseudechinolaena polystachya* (H. B. K.) Stapf. The brief description does not apply to the specimen so named nor to *E. crus-pavonis*. Willdenow differentiates the species from *P. crusgalli* (with "glumis aristatis hispidis") by "glumis aristatus muricato-echinatus," whereas in *E. crus-pavonis* the glumes are less muricate than in *E. crusgalli*.
- Setaria muricata* Beauv., Ess. Agrost. 51, 170, 178. 1812. Based on *Panicum muricatum* Michx.

(141) ECHINOCHLOA Beauv.

- (2) **Echinochloa colonum** (L.) Link, Hort. Berol. 2: 209. 1833. Based on *Panicum colonum* L.
- Panicum colonum* L., Syst. Nat. ed. 10. 2: 870. 1759. Jamaica, Browne.
- Milium colonum* Moench, Meth. Pl. 202. 1794. Based on *Panicum colonum* L.

- ?*Echinochloa echinata* Beauv., Ess. Agrost. 53, 161, 169. 1812. Based on *Panicum echinatum* Willd.
- Panicum crusgalli* var. *aristatum* Pursh, Fl. Amer. Sept. 66. 1814. North America.
- Panicum pungens* Poir. in Lam., Encycl. Sup. 4: 273. 1816. Based on *P. muricatum* Michx.
- Pennisetum crusgalli* Baumg., Enum. Stirp. Transsilv. 3: 277. 1816. Based on *Panicum crusgalli* L.
- Echinochloa crusgalli* var. *aristata* S. F. Gray, Nat. Arr. Brit. Pl. 2: 158. 1821. Great Britain.
- Oplismenus crusgalli* Dum., Obs. Gram. Belg. 138. 1823. Based on *Panicum crusgalli* L.
- ?*Orthopogon echinatus* Spreng., Syst. Veg. 1: 307. 1825. Based on *Panicum echinatum* Willd.
- Orthopogon crusgalli* Spreng., Syst. Veg. 1: 307. 1825. Based on *Panicum crusgalli* L.
- Oplismenus muricatus* Kunth, Rév. Gram. 1: 44. 1829. Based on *Panicum muricatum* Michx.
- ?*Oplismenus echinatus* Kunth, Rév. Gram. 1: 45. 1829. Based on *Panicum echinatum* Willd.
- ?*Panicum crusgalli* var. *echinatum* Doellin Mart., Fl. Bras. 2²: 143. 1877. Based on *P. echinatum* Willd.
- Echinochloa muricata* Fernald, Rhodora 17: 106. 1915. Based on *Panicum muricatum* Michx.
- Echinochloa crusgalli* forma *vittata* Hubb., Rhodora 18: 232. 1916. New Brunswick, Hubbard 763.
- Echinochloa crusgalli* var. *muricata* Farwell, Mich. Acad. Sci. Rpt. 21: 350. 1920. Based on *Panicum muricatum* Michx.
- Echinochloa crusgalli* var. *michauxii* House, N. Y. State Mus. Bul. 243-244: 42. 1923. Based on *Panicum muricatum* Michx.
- Echinochloa pungens* Rydb., Brittonia 1: 81. 1931. Based on *Panicum pungens* Poir.
- Echinochloa pungens* var. *coarctata* Fern. and Grise., Rhodora 37: 136. pl. 336. f. 1, 2. 1935. Pungo Ferry, Va., Fernald and Griscom 2760.
- ECHINOCHLOA CRUSGALLI VAR. FRUMENTACEA (Roxb.) W. F. Wight, Cent. Dict. Sup. 810. 1909. Presumably based on *Panicum frumentaceum* Roxb. (Published as *E. crusgalli frumentacea*.)
- Panicum frumentaceum* Roxb., Fl. Ind. 1: 307. 1820. Not *P. frumentaceum* Salisb., 1796. India.
- Echinochloa frumentacea* Link, Hort. Berol. 1: 204. 1827. Based on *Panicum frumentaceum* Roxb.
- Oplismenus frumentaceus* Kunth, Rév. Gram. 1: 445. 1829. Based on *Panicum frumentaceum* Roxb.
- Panicum crusgalli* var. *frumentaceum* Trimen, Syst. Cat. Ceylon Pl. 104. 1885. Based on *P. frumentaceum* Roxb.
- Echinochloa crusgalli edulis* Hitchc., U. S. Dept. Agr. Bul. 772: 238. 1920. Based on *Panicum frumentaceum* Roxb.
- Echinochloa crusgalli* subsp. *colonom* var. *edulis* Honda, Bot. Mag. [Tokyo] 37: 123. 1923. Based on *E. crusgalli* var. *edulis* Hitchc.
- Echinochloa colonum* var. *frumentacea* Ridl., Fl. Malay Pen. 5: 223. 1925. Presumably based on *Panicum frumentaceum* Roxb.
- Panicum crusgalli* subsp. *colonom* var. *edulis* Makino and Nemoto, Fl. Jap. 1470. 1925. Based on *P. frumentaceum* Roxb.
- ECHINOCHLOA CRUSGALLI VAR. MITIS (Pursh) Peterm., Fl. Lips. 82. 1838. Based on *Panicum crusgalli* var. *mite* Pursh.
- Panicum crusgalli* var. *mite* Pursh, Fl. Amer. Sept. 66. 1814. North America.
- Panicum crusgalli* var. *purpureum* Pursh, Fl. Amer. Sept. 66. 1814. North America.
- Panicum crusgalli* var. *muticum* Ell., Bot. S. C. and Ga. 1: 114. 1816. Probably South Carolina.
- Panicum scindens* Nees ex Steud., Syn. Pl. Glum. 1: 47. 1854. St. Louis [Drummond].
- Oplismenus crusgalli* var. *muticus* Wood, Amer. Bot. and Flor. pt. 2: 393. 1871. Eastern States.
- Panicum crusgalli* α *normale* var. *mite* forma *hispidum* Kuntze, Rev. Gen. Pl. 2: 783. 1891. Pennsylvania.
- Echinochloa crusgalli* var. *mutica* Rydb., Colo. Agr. Col. Bul. 100: 21. 1906. Presumably based on *Panicum crusgalli* var. *muticum* Ell.
- Echinochloa crusgalli* forma *purpurea* Farwell, Mich. Acad. Sci. Rpt. 21: 349. 1920. Based on *Panicum crusgalli* var. *purpureum* Pursh.
- Echinochloa zelayensis* var. *macera* Wiegand, Rhodora 23: 54. 1921. Matamoros, Mexico, Berlandier 890.
- Echinochloa muricata* var. *ludoviciana* Wiegand, Rhodora 23: 58. 1921. Baton Rouge, La., Billings 14.
- Echinochloa muricata* var. *occidentalis* Wiegand, Rhodora 23: 58. 1921. Grand Tower, Ill., Gleason 1720. (See *E. pungens* var. *wiegandii* below.)
- Echinochloa muricata* var. *microstachya* Wiegand, Rhodora 23: 58. 1921. Cayuga Lake Basin, N. Y., Palmer 97.
- Echinochloa muricata* var. *multiflora* Wiegand, Rhodora 23: 59. 1921. Lincoln County, Okla., Blankenship.
- Echinochloa microstachya* Rydb., Brittonia 1: 82. 1931. Based on *E. muricata* var. *microstachya* Wiegand.

- Echinochloa occidentalis* Rydb., Brittonia 1: 82. 1931. Based on *E. muricata* var. *occidentalis* Wiegand.
- Echinochloa pungens* var. *ludoviciana* Fern. and Grise., Rhodora 37: 137. 1935. Based on *E. muricata* var. *ludoviciana* Wiegand.
- Echinochloa pungens* var. *microstachya* Fern. and Grise., Rhodora 37: 137. 1935. Based on *E. muricata* var. *microstachya* Wiegand.
- Echinochloa pungens* var. *multiflora* Fern. and Grise., Rhodora 37: 137. 1935. Based on *E. muricata* var. *multiflora* Wiegand.
- Echinochloa pungens* var. *occidentalis* Fern. and Grise., Rhodora 37: 137. 1935. Based on *E. muricata* var. *occidentalis* Wiegand.
- Echinochloa pungens* var. *wiegandii* Fassett, Rhodora 51: 2. 1949. Based on the description of *E. muricata* var. *occidentalis* Wieg., but excluding the cited type, Gleason 1720.
- ECHINOCHLOA CRUSGALLI** var. **ZELAYENSIS** (H. B. K.) Hitchc., U. S. Dept. Agr. Bul. 772: 238. 1920. Based on *Oplismenus zelayensis* H. B. K. (Published as *E. crusgalli zelayensis*.)
- Oplismenus zelayensis* H. B. K., Nov. Gen. et Sp. 1: 108. 1815. Zelaya, Mexico, Humboldt and Bonpland.
- Echinochloa zelayensis* Schult., Mantissa 2: 269. 1824. Based on *Oplismenus zelayensis* H. B. K.
- Panicum zelayense* Steud., Nom. Bot. ed. 2: 2: 265. 1841. Based on *Oplismenus zelayensis* H. B. K.
- Panicum crus-pici* Willd. ex Doell, in Mart., Fl. Bras. 2^o: 143. 1877. Name only. South America.
- ?*Panicum crusgalli* α normale var. *pygmaeum* Kuntze, Rev. Gen. Pl. 2: 783. 1891. Colorado.
- Echinochloa crusgalli* forma *zelayensis* Farwell, Mich. Acad. Sci. Papers 26: 4. 1941. Based on *Oplismenus zelayensis* H. B. K.
- (4) **Echinochloa crus-pavonis** (H. B. K.) Schult., Mantissa 2: 269. 1824. Based on *Oplismenus crus-pavonis* H. B. K.
- Oplismenus crus-pavonis* H. B. K., Nov. Gen. et Sp. 1: 108. 1815. Cumaná, Venezuela, Humboldt and Bonpland.
- Panicum crusgalli* var. *sabulicolum* Trin., Gram. Icon. 2: pl. 163. 1828. Brasil.
- Panicum sabulicola* Nees, Agrost. Bras. 258. 1829. Pará, Brazil, Sieber; Uruguay and Paraguay.
- Panicum crus-pavonis* Nees, Agrost. Bras. 259. 1829. Based on *Oplismenus crus-pavonis* H. B. K.
- Echinochloa composita* Presl ex Nees, Agrost. Bras. 259. 1829, as synonym of *Panicum crus-pavonis* Nees. Acapulco, Mexico, Haenke.
- Oplismenus sabulicola* Kunth, Rev. Gram. 1: Sup. 11, 1830. Based on *Panicum sabulicola* Nees.
- Panicum aristatum* Macfad., Bot. Misc. Hook. 2: 115. 1831. Jamaica, [Macfadden].
- Oplismenus jamaicensis* Kunth, Enum. Pl. 1: 147. 1833. Based on *Panicum aristatum* Macfad.
- Panicum jamaicense* Steud., Nom. Bot. ed. 2: 2: 257. 1841. Based on *Oplismenus jamaicensis* Kunth.
- Panicum crusgalli* var. *sabulicola* Doell in Mart., Fl. Bras. 2^o: 142. 1877. Based on *P. sabulicola* Nees.
- Oplismenus angustifolius* Fourn., Mex. Pl. 2: 40. 1886. Vera Cruz, Mexico, Gouin 54 [error for 50].
- Echinochloa sabulicola* Hitchc., U. S. Natl. Herb. Contrib. 17: 257. 1913. Based on *Panicum sabulicola* Nees.
- Echinochloa crusgalli* *crus-pavonis* Hitchc., U. S. Natl. Herb. Contrib. 22: 148. 1920. Based on *Oplismenus crus-pavonis* H. B. K.
- Echinochloa crusgalli* forma *sabulonum* Farwell, Mich. Acad. Sci. Rpt. 21: 349. 1920. Based on "*Panicum crusgalli* var. *sabulonum* Trin.," error for var. *sabulicolum* Trin.
- Echinochloa zelayensis* var. *subaristata* Wiegand, Rhodora 23: 54. 1921. Pierce, Texas, Tracy 7743.
- (5) **Echinochloa paludigena** Wiegand, Rhodora 23: 64. 1921. Hillsborough County, Fla., Fredholm 6390.
- Echinochloa paludigena* var. *soluta* Wiegand, Rhodora 23: 64. 1921. Manatee, Fla., Tracy 7754.
- (1) **Echinochloa polystachya** (H. B. K.) Hitchc., U. S. Natl. Herb. Contrib. 22: 135. 1920. Based on *Oplismenus polystachyus* H. B. K.
- Oplismenus polystachyus* H. B. K., Nov. Gen. et Sp. 1: 107. 1815. Colombia, Humboldt and Bonpland.
- (6) **Echinochloa walteri** (Pursh) Heller, Cat. N. Amer. Pl. ed. 2. 21. 1900. Based on *Panicum walteri* Pursh.
- Panicum hirtellum* Walt., Fl. Carol. 72. 1788. Not *P. hirtellum* L., 1759. South Carolina.
- Panicum walteri* Pursh, Fl. Amer. Sept. 66. 1814. Based on *P. hirtellum* Walter.
- Panicum crusgalli* var. *hispidum* Ell., Bot. S. C. and Ga. 1: 114. 1816. Based on *P. hispidum* Muhl., in manuscript.
- Panicum hispidum* Muhl., Descr. Gram. 107. 1817. Not *P. hispidum* Forst., 1786. New York to Carolina. Name only, Muhl., Cat. Pl. 9. 1813.
- Orthopogon hispidus* Spreng., Syst. Veg. 1: 307. 1825. Based on *Panicum hispidum* Muhl.
- Oplismenus hispidus* Wood, Class-book ed. 2. 604. 1847. Based on *Panicum hispidum* Muhl.

- Oplismenus crugalli* var. *hispidus* Wood, Amer. Bot. and Flor. pt. 2: 393. 1871. Presumably based on *Panicum hispidum* Muhl.
- Echinochloa longearistata* Nash in Small, Fl. Southeast. U. S. 84. 1903. Louisiana, Hale.
- Panicum crugalli* var. *walteri* Farwell, Mich. Acad. Sci. Rpt. 6: 202. 1904. Based on *P. walteri* Pursh.
- Echinochloa crugalli* var. *hispidus* Farwell, Amer. Midl. Nat. 9: 4. 1925. Based on *Panicum hispidum* Muhl.
- Echinochloa walteri* forma *brevisetata* Fern. and Griseb., Rhodora 37: 137. 1935. North Landing, Norfolk County, Va., Fernald and Griseb. 2761.
- ECHINOCHLOA WALTERI** forma **LAEVIGATA** Wiegand, Rhodora 23: 62. 1921. Based on *Panicum longisetum* Torr.
- Panicum longisetum* Torr., Amer. Jour. Sci. 4: 58. 1822. Not *P. longisetum* Poir., 1816. Fox River, Wis. [Douglas in 1820].
- Oplismenus longisetus* Kunth, Rév. Gram. 1: 45. 1829. Based on *Panicum longisetum* Torr.
- Echinochloa crugalli* var. *hispidus* subvar. *laevigata* Farwell, Amer. Midl. Nat. 9: 4. 1925. Based on *E. walteri* forma *laevigata* Wiegand.
- (32A) **ECTOSPERMA** Swallen
- (1) **Ectosperma alexandrae** Swallen, Wash. Acad. Sci. Jour. 40: 19 f. 1. 1950. Inyo County, Calif., Alexander and Kellogg 5655.
- EHRHARTA** Thunb.
- Ehrharta calycina** J. E. Smith, Pl. Icon. Ined. pl. 33. 1790. Cape of Good Hope, Africa.
- Ehrharta capensis** Thunb., Svensk. Akad. Handl. 40: 217. pl. 8. 1779. Cape of Good Hope, Africa.
- Ehrharta erecta** Lam., Encycl. 2: 347. 1786. South Africa.
- (100) **ELEUSINE** Gaertn.
- Eleusine coracana** (L.) Gaertn., Fruct. et Sem. 1: 8. pl. 1. 1788. Based on *Cynosurus coracanus* L.
- Cynosurus coracanus* L., Syst. Nat. ed. 10. 2: 875. 1759. East Indies.
- (1) **Eleusine indica** (L.) Gaertn., Fruct. et Sem. 1: 8. 1788. Based on *Cynosurus indicus* L.
- Cynosurus indicus* L., Sp. Pl. 72. 1753. India.
- Eleusine gracilis* Salisb., Prodr. Stirp. 19. 1796. Based on *Cynosurus indicus* L.
- Eleusine domingensis* Sieber ex Schult., Mantissa 2: 323. 1824. Not *E. domingensis* Pers., 1805. As synonym of *E. indica* Lam. (error for Gaertn.).
- Cynodon indicus* Raspail, Ann. Sci. Nat., Bot. 5: 303. 1825. Based on *Eleusine indica* Lam. (error for Gaertn.).
- Chloris repens* Steud., Nom. Bot. ed. 2. 1: 353. 1840, as synonym of *Eleusine indica* Pers. (error for Gaertn.).
- Eleusine scabra* Fourn. ex Hemsl., Biol. Centr. Amer. Bot. 3: 565. 1885, name only; Fourn., Mex. Pl. 2: 145. 1886. Mexico, Bourgeau 1030, 2378 in part, 2634, 2743; Virlet 1435; Bilimek 454; Müller 1392; Gouin 67.
- Eleusine indica* var. *major* Fourn., Mex. Pl. 2: 145. 1886. Mexico, Liebmann 222, 223, 227; Karwinsky 955.
- Eleusine tristachya** (Lam.) Lam., Tabl. Encycl. 1: 203. 1791. Based on *Cynosurus tristachyus* Lam.
- Cynosurus tristachyus* Lam., Tabl. Encycl. 2: 188. 1786. Uruguay, Commerson.
- (46) **ELYMUS** L.
- (11) **Elymus ambiguus** Vasey and Scribn., U. S. Natl. Herb. Contrib. 1: 280. 1893. Pen Gulch, Colo., Vasey in 1884.
- ELYMUS AMBIGUUS** var. **STRIGOSUS** (Rydb.) Hitchc., Amer. Jour. Bot. 21: 133. 1934. Based on *E. strigosus* Rydb.
- Elymus strigosus* Rydb., Torrey Bot. Club Bul. 32: 609. 1905. Boulder, Colo., Letterman 553 [type]; Wyoming, A. Nelson 7151.
- Elymus villiflorus* Rydb., Torrey Bot. Club Bul. 32: 609. 1905. Boulder, Colo., Tweedy 4818.
- (5) **Elymus arenicola** Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Cir. 9: 7. 1899. Suferts, Oreg., Leckenby in 1898.
- Leymus arenicola* Pilger, Bot. Jahrb. 74: 6. 1945. Based on *Elymus arenicola* Scribn. and Smith.
- (19) **Elymus aristatus** Merr., Rhodora 4: 147. 1902. Harney County, Oreg., Cusick 2712.
- Elymus glaucus aristatus* Hitchc. in Abrams, Illustr. Fl. 1: 252. 1923. Based on *E. aristatus* Merr.
- (22) **Elymus canadensis** L., Sp. Pl. 83. 1753. Canada, Kalm.
- Elymus philadelphicus* L., Cent. Pl. 1: 6. 1755; Moench. Acad. 4: 266. 1759. Pennsylvania, Kalm.
- Hordeum patulum* Moench, Meth. Pl. 199. 1794. Garden plant, *Elymus canadensis* L., cited as synonym.
- Elymus glaucifolius* Muhl. in Willd., Enum. Pl. 1: 131. 1809. Pennsylvania, Muhlenberg.
- Elymus canadensis* var. *glaucifolius* Torr., Fl. North. and Mid. U. S. 1: 137. 1823. Based on *E. glaucifolius* Muhl.
- Elymus canadensis* var. *pendulus* Eaton and Wright, N. Amer. Bot. ed. 8. 232. 1840. No locality cited.
- Sitanion brodiei* Piper, Erythea 7: 100. 1899. Bishop's Bar, Snake River, Wash., Brodie in 1895.

- Hordeum canadense* Aschers. and Graebn., Syn. Mitteleur. Fl. 2: 745. 1902. Based on *Elymus canadensis* L.
- Terrellia canadensis* Lunell, Amer. Midl. Nat. 4: 228. 1915. Based on *Elymus canadensis* L.
- Terrellia canadensis* var. *glaucofolia* Lunell, Amer. Midl. Nat. 4: 228. 1915. Based on *Elymus glaucofolius* Muhl.
- Elymus robustus* var. *vestitus* Wiegand, Rhodora 20: 90. 1918. Cedar Point, Ohio, MacDaniels 106.
- Elymus canadensis* var. *philadelphicus* Farwell, Mich. Acad. Sci. Rpt. 21: 357. 1920. Based on *E. philadelphicus* L.
- Elymus philadelphicus* var. *hirsutus* Farwell, Amer. Midl. Nat. 10: 314. 1927. Name proposed for *E. canadensis* as described by Wiegand (Rhodora 20: 87. 1918) "in large part."
- Elymus philadelphicus* var. *pendulus* Farwell, Amer. Midl. Nat. 10: 314. 1927. Based on *E. canadensis* var. *pendulus* Eaton and Wright.
- Clinelymus canadensis* Nevski, Jard. Bot. Acad. Sci. U. R. S. S. Bul. 30: 650. 1932. Based on *Elymus canadensis* L.
- Elymus canadensis* forma *glaucofolius* Fernald, Rhodora 35: 191. 1933. Based on *E. glaucofolius* Muhl.
- Elymus wiegandii* Fernald, Rhodora 35: 192. 1933. St. Francis, Maine, Fernald 197.
- Elymus wiegandii* forma *calvescens* Fernald, Rhodora 35: 192. 1933. Dead River, Maine, Fernald and Strong in 1896.
- ELYMUS CANADENSIS** var. **BRACHYSTACHYS** (Scribn. and Ball) Farwell, Mich. Acad. Sci. Rpt. 21: 357. 1920. Based on *E. brachystachys* Scribn. and Ball.
- Elymus brachystachys* Scribn. and Ball, U. S. Dept. Agr., Div. Agrost. Bul. 24: 47. f. 21. 1901. Indian Territory [Oklahoma], Palmer 420.
- Elymus philadelphicus* var. *brachystachys* Farwell, Amer. Midl. Nat. 10: 314. 1927. Based on *E. brachystachys* Scribn. and Ball.
- ELYMUS CANADENSIS** var. **ROBUSTUS** (Scribn. and Smith) Mackenz. and Bush, Man. Fl. Jackson County 38. 1902. Based on *E. robustus* Scribn. and Smith.
- Elymus canadensis* forma *crescendus* Ramaley, Minn. Bot. Studies 1: 114. 1894. Springfield, Minn., Sheldon 1120.
- Elymus robustus* Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 37. 1897. Illinois [type, Wolf], Iowa, Kansas, and Montana.
- Elymus crescendus* Wheeler, Minn. Bot. Studies 3: 106. 1903. Based on *E. canadensis* forma *crescendus* Ramaley.
- Elymus canadensis villosus* Bates, Amer. Bot. 20: 17. 1914. Loup City and Arcadia, Nebr., Bates in 1911.
- Elymus glaucofolius crescendus* Bush, Amer. Midl. Nat. 10: 83. 1926. Based on *E. canadensis* forma *crescendus* Ramaley.
- Elymus glaucofolius robustus* Bush, Amer. Midl. Nat. 10: 87. 1926. Based on *E. robustus* Scribn. and Smith.
- Elymus philadelphicus* var. *robustus* Farwell, Amer. Midl. Nat. 10: 314. 1927. Based on *E. robustus* Scribn. and Smith.
- (1) **Elymus caput-medusae** L., Sp. Pl. 84. 1753. Southern Europe.
- Hordeum caput-medusae* Coss. and Dur., Expl. Sci. Alger. 2: 198. 1855. Based on *Elymus caput-medusae* L.
- Taeniatherum caput-medusae* Nevski, Act. Univ. Asiae Med. VIII b. Bot. 17: 38. 1934. Based on *Elymus caput-medusae* L.
- (14) **Elymus cinereus** Scribn. and Merr., Torrey Bot. Club Bul. 29: 467. 1902. Pahump Valley, Nev., Purpus 6050.
- Elymus condensatus* var. *pubens* Piper, Erythea 7: 101. 1899. Yakima City, Wash., Piper 2591. (Published as *E. condensatus pubens*.)
- Elymus condensatus* forma *pubens* St. John, Fl. Southeast. Wash. and Adj. Idaho 42. 1937. Based on *E. condensatus* var. *pubens* Piper.
- (13) **Elymus condensatus** Presl, Rel. Haenk. 1: 265. 1830. Monterey, Calif. Haenke.
- Aneurolepidium condensatum* Nevski, Akad. Nauk. S. S. S. R. Bot. Inst. Trudy I. (Acad. Sci. U. R. S. S. Inst. Bot. Acta I, Flora et Syst. Plant. Vasc.) 1: 14. 1933. Based on *Elymus condensatus* Presl.
- (4) **Elymus flavescens** Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 8: 8. f. 1. 1897. Columbus, Wash., Suksdorf 916.
- Leymus flavescens* Pilger, Bot. Jahrb. 74: 6. 1945. Based on *Elymus flavescens* Scribn. and Smith.
- Elymus giganteus** Vahl, Symb. Bot. 3: 10. 1794. Old World.
- Leymus giganteus* Pilger, Bot. Jahrb. 74: 6. 1945. Based on *Elymus giganteus* Vahl.
- (15) **Elymus glaucus** Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 99. 1862. Columbia River, Oreg., Nuttall.
- Elymus villosus* var. *glabriusculus* Torr., U. S. Expl. Miss. Pacif. Rpt. 4: 157. 1857. Napa Valley, Calif.
- Elymus nitidus* Vasey, Torrey Bot. Club Bul. 13: 120. 1886. Eagle Mountains, Oreg., Cusick [1130].
- Elymus americanus* Vasey and Scribn. ex Macoun, Can. Pl. Cat. 24: 245. 1888, name only; Cassidy, Colo. Agr. Expt. Sta. Bul. 12: 57. 1890. Arapahoe Pass, Colo.
- Elymus sibiricus* var. *americanus* Wats. and Coult. in A. Gray, Man. ed. 6. 673. 1890. Michigan and westward.
- Elymus sibiricus* var. *glaucus* Ramaley,

- Minn. Bot. Studies 9: 112. 1894. Based on *E. glaucus* Buckl.
- Elymus glaucus* var. *breviaristatus* Davy in Jepson, Fl. West. Mid. Calif. 79. 1901. Point Reyes, Calif., *Davy*.
- Elymus glaucus* var. *maximus* Davy in Jepson, Fl. West. Mid. Calif. 79. 1901. Napa Valley, Calif., *Jepson*.
- Elymus hispidulus* Davy in Jepson, Fl. West. Mid. Calif. 79. 1901. Olema, Calif., *Davy* 4306b.
- Elymus angustifolius* Davy in Jepson, Fl. West. Mid. Calif. 80. 1901. San Francisco, Calif., *Davy*.
- Elymus angustifolius* var. *caespitosus* Davy in Jepson, Fl. West. Mid. Calif. 81. 1901. Berkeley Hills, Calif., *Davy* 4255.
- Elymus marginalis* Rydb., Torrey Bot. Club Bul. 36: 539. 1909. Lower Arrow Lake, British Columbia, *Macoun* 44.
- Terrellia glauca* Lunell, Amer. Midl. Nat. 4: 228. 1915. Based on *Elymus glaucus* Buckl.
- Elymus mackenzii* Bush, Amer. Midl. Nat. 10: 53. 1926. Eagle Rock, Mo., *Bush* 77.
- Clinelymus glaucus* Nevski, Jard. Bot. Acad. Sci. U. R. S. S. Bul. 30: 648. 1932. Based on *Elymus glaucus* Buckl.
- Clinelymus glaucus* subsp. *californicus* Nevski, Jard. Bot. Acad. Sci. U. R. S. S. Bul. 30: 649. 1932. California, *Heller* 5714-a, first of several cited from California.
- Clinelymus glaucus* subsp. *coloratus* Nevski, Jard. Bot. Acad. Sci. U. R. S. S. Bul. 30: 648. 1932. Washington, *Heller* 3965.
- ELYMUS GLAUCUS* var. *JEPSONI* Davy in Jepson, Fl. West. Mid. Calif. 79. 1901. Napa Valley, Calif., *Jepson*.
- Elymus divergens* Davy in Jepson, Fl. West. Mid. Calif. 80. 1901. Petaluma, Calif., *Davy* 4037.
- Elymus velutinus* Scribn. and Merr., Torrey Bot. Club Bul. 29: 466. 1902. San Bernardino Mountains, Calif., *Abrams* 2056.
- Elymus parishii* Davy and Merr., Calif. Univ. Pubs., Bot. 1: 58. 1902. San Jacinto Mountains, Calif., *Hall* 2097.
- Elymus edentatus* Suksdorf, Werdenda 1²: 4. 1923. Bingen, Wash., *Suksdorf* 10057.
- Clinelymus glaucus* subsp. *californicus* var. *pubescens* Nevski, Jard. Bot. Acad. Sci. U. R. S. S. Bul. 30: 649. 1932. California, *Tiling* 8822; *Palmer* 417.
- Clinelymus velutinus* Nevski, Jard. Bot. Acad. Sci. U. R. S. S. Bul. 30: 649. 1932. Based on *Elymus velutinus* Scribn. and Merr.
- Elymus glaucus* forma *jepsoni* St. John, Fl. Southeast. Wash. and Adj. Idaho 42. 1937. Based on *E. glaucus* var. *jepsoni* Davy.
- Elymus glaucus* subsp. *jepsoni* Gould, Madroño 9: 126. 1947. Based on *E. glaucus* var. *jepsoni* Davy.
- ELYMUS GLAUCUS* var. *TENUIS* Vasey, U. S. Natl. Herb. Contrib. 1: 280. 1893. "Type specimen collected by John Macoun on Vancouver Island in 1887 (No. 3)" comprises two forms, all Macoun's No. 3. One specimen is a small form of *E. glaucus* var. *jepsoni*; the others have spikes with fragile rachises, spikelets with 5- to 6-nerved glumes and lemmas with divergent awns and apparently represent a form not found in the United States. There is another Macoun specimen upon which Vasey has written the varietal name *tenuis*, this specimen having glabrous sheaths and divergent awns. The description states that the sheaths are glabrous or pubescent and that the awns are divergent. Hence the plant of number 3 with divergent awns is selected as the type of *E. glaucus* var. *tenuis*, and the name is excluded from our flora.
- (17) *Elymus hirsutus* Presl, Rel. Haenk. 1: 264. 1830. Nootka Sound, Vancouver Island, *Haenke*.
- Elymus ciliatus* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 11: 57. pl. 16. 1898. Not *E. ciliatus* Muhl., 1817. Sitka, Alaska, *Evans* 210.
- Elymus borealis* Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 27: 9. 1900. Based on *E. ciliatus* Scribn.
- Clinelymus borealis* Nevski, Jard. Bot. Acad. Sci. U. R. S. S. Bul. 30: 645. 1932. Based on *Elymus borealis* Scribn.
- (7) *Elymus hirtiflorus* Hitchc., Amer. Jour. Bot. 21: 132. f. 2. 1934. Green River, Wyo., *Shear* 284.
- (6) *Elymus innovatus* Beal, Grasses N. Amer. 2: 650. 1896. North Fork Sims River, Mont., *Williams* in 1887.
- Elymus mollis* R. Br. in Richards., Bot. App. Franklin Jour. 732. 1823. Not *E. mollis* Trin., 1821. Canada [*Richardson*].
- Elymus brownii* Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 8: 7. pl. 4. 1897. Banff, Alberta, *Canby* 24 in 1895.
- Leymus innovatus* Pilger, Bot. Jahrb. 74: 6. 1945. Based on *Elymus innovatus* Beal.
- (21) *Elymus interruptus* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 99. 1862. Llano County, Tex., *Buckley*.
- Elymus occidentalis* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 13: 49. 1898. Laramie River, Wyo., *Nelson* 4470.
- Elymus diversiglumis* Scribn. and Ball, U. S. Dept. Agr., Div. Agrost. Bul. 24: 48. f. 22. 1901. Bear Lodge Mountains, Wyo., *Williams* 2653.
- Terrellia diversiglumis* Lunell, Amer. Midl. Nat. 4: 228. 1915. Based on *Elymus diversiglumis* Scribn. and Ball.
- (18) *Elymus macounii* Vasey, Torrey Bot. Club Bul. 13: 119. 1886. Great Plains of British Columbia, *Macoun*.

- Terrellia macounii* Lunell, Amer. Midl. Nat. 4: 228. 1915. Based on *Elymus macounii* Vasey.
- (2) *Elymus mollis* Trin. in Spreng., Neu. Entd. 2: 72. 1821. Kamchatka and the Aleutian Islands.
- Elymus dives* Presl, Rel. Haenk. 1: 265. 1830. Nootka Sound, Vancouver Island, Haenke.
- Elymus arenarius* var. *villosus* E. Meyer, Pl. Labrad. 20. 1830. Labrador.
- Elymus ampliculmis* Provancher, Fl. Canad. 2: 706. 1862. Canada.
- Elymus capitatus* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 11: 55. pl. 14. 1898. Homer, Alaska, Evans 471. Abnormal form.
- Elymus mollis brevispicus* Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 11: 56. 1898. St. Lawrence Bay, Siberia.
- Elymus villosissimus* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 17: 326. f. 622. 1899. St. Paul Island, Macoun 16226.
- Elymus arenarius* forma *compositus* Abromeit, Bibl. Bot. 8: heft 42: 96. 1899. Greenland.
- Elymus arenarius* var. *mollis* Koidzumi, Tokyo Imp. Univ., Col. Sci. Jour. 27: 24. 1910. Based on *E. mollis* Trin.
- Elymus arenarius* var. *compositus* St. John, Rhodora 17: 102. 1915. Based on *E. arenarius* forma *compositus* Abromeit.
- Leymus mollis* Pilger, Bot. Jahrb. 74: 6. 1945. Based on *Elymus mollis* Trin.
- (9) *Elymus pacificus* Gould, Madroño 9: 127. 1947. Based on *Agropyron arenicola* Davy, not *Elymus arenicola* Scribn. and Smith.
- Agropyron arenicola* Davy in Jepson, Fl. West. Mid. Calif. 76. 1901. Point Reyes, Calif., Davy 6879.
- (23) *Elymus riparius* Wiegand, Rhodora 20: 84. 1918. Ithaca, N. Y., Eames and MacDaniels 3567.
- (12) *Elymus salinus* Jones, Calif. Acad. Sci. Proc. II. 5: 725. 1895. Salina Pass, Utah, Jones 5447. The name is spelled "salina" in the text, but "salinus" in Jones' index; salina was doubtless a slip of the pen.
- (10) *Elymus simplex* Scribn. and Williams, U. S. Dept. Agr., Div. Agrost. Bul. 11: 57. pl. 17. 1898. Green River, Wyo., Williams 2334.
- Elymus triticoides* var. *simplex* Hitchc., Amer. Jour. Bot. 21: 132. 1934. Based on *E. simplex* Scribn. and Williams.
- (8) *Elymus triticoides* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 99. 1862. "Rocky Mountains," Nuttall.
- Elymus condensatus* var. *triticoides* Thurb. in S. Wats., Bot. Calif. 2: 326. 1880. Based on *E. triticoides* Buckl.
- Elymus orcuttianus* Vasey, Bot. Gaz. 10: 258. 1885. San Diego, Calif., Orcutt.
- Elymus simplex* var. *luxurians* Scribn. and Williams, U. S. Dept. Agr., Div. Agrost. Bul. 11: 58. 1898. Green River, Wyo., Williams 2338.
- Elymus acicularis* Suksdorf, Werdenda 12: 3. 1923. Bingen, Wash., Suksdorf 7861.
- Leymus triticoides* Pilger, Bot. Jahrb. 74: 6. 1945. Based on *Elymus triticoides* Buckl.
- ELYMUS TRITICOIDES subsp. MULTIFLORUS Gould, Madroño 8: 46. 1945. Contra Costa County, Calif., Gould 1304.
- ELYMUS TRITICOIDES var. PUBESCENS Hitchc. in Jepson, Fl. Calif. 1: 186. 1912. Griffin, Calif., Elmer 3748.
- (3) *Elymus vancouverensis* Vasey, Torrey Bot. Club Bul. 15: 48. 1888. Vancouver Island, Macoun in 1887.
- Leymus vancouverensis* Pilger, Bot. Jahrb. 74: 6. 1945. Based on *Elymus vancouverensis* Vasey.
- (20) *Elymus villosus* Muhl. in Willd., Enum. Pl. 1: 131. 1809. Pennsylvania, Muhlenberg.
- Elymus ciliatus* Muhl., Descr. Gram. 179. 1817. North Carolina. Name only, Muhl., Cat. Pl. 14. 1813.
- Elymus hirsutus* Schreb. ex Roem. and Schult., Syst. Veg. 2: 776. 1817, as synonym of *E. villosus* Muhl.
- Elymus striatus* var. *villosus* A. Gray, Man. 603. 1848. Based on *E. villosus* Muhl.
- Elymus propinquus* Fresen. ex Steud., Syn. Pl. Glum. 1: 349. 1854. Illinois.
- Elymus striatus* var. *ballii* Pammel, Iowa Geol. Survey Sup. Rpt. 1903: 347. f. 246. 1905. Iowa [type, from which figure was drawn, Johnson County, Fitzpatrick].
- Hordeum villosum* Schenck, Bot. Jahrb. 40: 109. 1907. Based on *Elymus villosus* Muhl.
- ELYMUS VILLOSUS forma ARKANSANUS (Scribn. and Ball) Fernald, Rhodora 35: 195. 1933. Based on *E. arkansanus* Scribn. and Ball.
- Elymus arkansanus* Scribn. and Ball, U. S. Dept. Agr., Div. Agrost. Bul. 24: 45. f. 19. 1901. Arkansas, Harvey.
- Elymus striatus* var. *arkansanus* Hitchc., Rhodora 8: 212. 1906. Based on *E. arkansanus* Scribn. and Ball.
- (16) *Elymus virescens* Piper, Erythea 7: 101. 1899. Olympic Mountains, Wash., Piper 1988.
- Elymus pubescens* Davy in Jepson, Fl. West. Mid. Calif. 78. 1901. Point Reyes, Calif.
- Elymus howellii* Scribn. and Merr., U. S. Natl. Herb. Contrib. 13: 88. 1910. Revillagigedo Island, British Columbia, Howell 1723.
- Elymus strigatus* St. John, Rhodora 17: 102. 1915. Westport, Mendocino County, Calif., Congdon in 1902.

- Elymus glaucus* var. *virescens* Gould, Madroño 9: 126. 1947. Based on *E. virescens* Piper.
- (24) *Elymus virginicus* L., Sp. Pl. 84. 1753. Virginia.
- Elymus carolinianus* Walt., Fl. Carol. 82. 1788. South Carolina.
- Hordeum cartilagineum* Moench, Meth. 199. 1794. Grown in botanic garden, Marburg, Germany.
- Elymus striatus* Willd., Sp. Pl. 1: 470. 1797. North America. Name only in Muhl., Amer. Phil. Soc. 2: 161. 1793.
- Elymus hordeiformis* Desf., Tabl. Ecol. Bot. Mus. 15. 1804, name only; Cat. Pl. Paris. ed. 3. 18, 387. 1829. Grown in botanical garden, Paris. "*E. striatus* Willd." cited as synonym.
- Elymus durus* Hedw. ex Steud., Nom. Bot. ed. 2. 1: 550. 1840, as synonym of *E. virginicus* L.
- Elymus virginicus* var. *minor* Vasey ex L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 550. 1892. Northern Texas, [Buckley].
- Elymus virginicus* forma *jejunos* Ramaley, Minn. Bot. Stud. 9: 114. 1894. Lake Benton, Minn., Sheldon 1735 (error for 1375).
- Hordeum virginicum* Schenck, Bot. Jahrb. 40: 109. 1907. Based on *Elymus virginicus* L.
- Hordeum striatum* Schenck, Bot. Jahrb. 40: 109. 1907. Based on *Elymus striatus* Willd.
- Elymus jejunos* Rydb., Torrey Bot. Club Bul. 36: 539. 1909. Based on *E. virginicus* forma *jejunos* Ramaley.
- Terrellia virginica* Lunell, Amer. Midl. Nat. 4: 228. 1915. Based on *Elymus virginicus* L.
- Terrellia striata* Lunell, Amer. Midl. Nat. 4: 228. 1915. Based on *Elymus striatus* Willd.
- Elymus virginicus* var. *jejunos* Bush, Amer. Midl. Nat. 10: 65. 1926. Based on *E. virginicus* forma *jejunos* Ramaley.
- Terrellia jejuna* Nevski, Jard. Bot. Acad. Sci. U. R. S. S. Bul. 30: 639. 1932. Based on *Elymus virginicus* forma *jejunos* Ramaley.
- Terrellia virginica* Nevski, Jard. Bot. Acad. Sci. U. R. S. S. Bul. 30: 639. 1932. Based on *Elymus virginicus* L.
- Elymus virginicus* var. *typicus* Fernald, Rhodora 35: 198. 1933. Based on *E. virginicus* L.
- Elymus virginicus* var. *micromeris* Schmoll, Rhodora 39: 416. 1937. Leeds, N. Dak., Lunell in 1900.
- ELYMUS VIRGINICUS var. AUSTRALIS (Scribn. and Ball) Hitchc. in Deam, Ind. Dept. Conserv. Pub. 82: 113. 1929. Based on *E. australis* Scribn. and Ball.
- Elymus australis* Scribn. and Ball, U. S. Dept. Agr., Div. Agrost. Bul. 24: 46. f. 20. 1901. Biltmore, N. C., Biltmore Herbarium 411b.
- Elymus virginicus* var. *glabriflorus* forma *australis* Fernald, Rhodora 35: 198. 1933. Based on *E. australis* Scribn. and Ball.
- ELYMUS VIRGINICUS var. GLABRIFLORUS (Vasey) Bush, Amer. Midl. Nat. 10: 62. 1926. Based on *E. canadensis* var. *glabriflorus* Vasey.
- Elymus canadensis* var. *glabriflorus* Vasey ex L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 550. 1894. Texas to Georgia [Louisiana, Langlois].
- ?*Elymus virginicus* var. *glaucus* Beal, Grasses N. Amer. 2: 653. 1896. Agricultural College, Michigan, Beal 164, 165.
- Elymus glabriflorus* Scribn. and Ball, U. S. Dept. Agr., Div. Agrost. Bul. 24: 49. f. 23. 1901. Based on *E. canadensis* var. *glabriflorus* Vasey.
- Elymus australis* var. *glabriflorus* Wiegand, Rhodora 20: 84. 1918. Based on *E. canadensis* var. *glabriflorus* Vasey.
- ELYMUS VIRGINICUS var. HALOPHILUS (Bicknell) Wiegand, Rhodora 20: 83. 1918. Based on *E. halophilus* Bicknell.
- Elymus halophilus* Bicknell, Torrey Bot. Club Bul. 35: 201. 1908. Nantucket Island, Mass., Bicknell.
- Terrella halophila* Nevski, Jard. Bot. Acad. Sci. U. R. S. S. Bul. 30: 639. 1932. Based on *Elymus halophilus* Bicknell.
- Elymus virginicus* var. *halophilus* forma *lasiolepis* Fernald, Rhodora 35: 198. 1933. Nova Scotia, Fernald, Long, and Linder 20113.
- ELYMUS VIRGINICUS var. INTERMEDIUS (Vasey) Bush, Amer. Midl. Nat. 10: 60. 1926. Based on *E. canadensis* var. *intermedius* Vasey.
- Elymus canadensis* var. *intermedius* Vasey ex A. Gray, Man. ed. 6. 673. 1890. Northeastern United States. [Type, Lansingburg, N. Y., Howe in 1886.]
- Elymus intermedius* Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 38. 1897. Not *E. intermedius* Bieb., 1808. Maine to Virginia, west to Illinois and Nebraska. [Herbarium evidence shows this to be based on *E. canadensis* var. *intermedius* Vasey.]
- Elymus hirsutiglumis* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 11: 58. 1898. Based on *E. intermedius* Scribn. and Smith.
- Elymus virginicus* var. *hirsutiglumis* Hitchc., Rhodora 10: 65. 1908. Based on *E. hirsutiglumis* Scribn.
- Terrella hirsutiglumis* Nevski, Jard. Bot. Acad. Sci. U. R. S. S. Bul. 30: 639. 1932. Based on *Elymus hirsutiglumis* Scribn.
- Elymus virginicus* var. *typicus* forma *hir-*

- sutiglumis* Fernald, Rhodora 35: 198. 1933. Based on *E. hirsutiglumis* Scribn.
- ELYMUS VIRGINICUS** var. *SUBMUTICUS* Hook., Fl. Bor. Amer. 2: 255. 1840. Cumberland House Fort, Saskatchewan, *Drummond*.
- ?*Elymus virginicus* var. *arcuatus* Wood, Amer. Bot. and Flor. pt. 2: 405. 1871. Southern States.
- Elymus curvatus* Piper, Torrey Bot. Club Bul. 30: 233. 1903. Stevens County, Wash., *Kreager* 375.
- Elymus submuticus* Smyth, Kans. Acad. Sci. Trans. 25: 99. 1913. Based on *E. virginicus* var. *submuticus* Hook.
- Terrellia virginica* var. *submutica* Lunell, Amer. Midl. Nat. 4: 228. 1915. Based on *Elymus virginicus* var. *submuticus* Hook.
- Terrellia curvata* Nevski, Jard. Bot. Acad. Sci. U. R. S. S. Bul. 30: 639. 1932. Based on *Elymus curvatus* Piper.
- Elymus virginicus* forma *submutica* Pohl, Amer. Midl. Nat. 38: 549. 1947. Based on *E. virginicus* var. *submuticus* Hook.

(161) ELYONURUS Humb. and Bonpl. ex Willd.

- (1) **Elyonurus barbiculmis** Hack. in DC., Monogr. Phan. 6: 339. 1889. Texas, *Wright* 804; New Mexico, *Wright* 2106; Arizona, *Lemmon* 2926 [type]; *Rothrock* 638.
- Elyonurus barbiculmis* var. *parviflorus* Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 32: 1. 1901. Arizona, *Griffiths* 1849.
- (2) **Elyonurus tripsacoides** Humb. and Bonpl. ex Willd., Sp. Pl. 4: 941. 1806. Caracas, Venezuela, *Humboldt* and *Bonpland*.
- Rottboellia ciliata* Nutt., Gen. Pl. 1: 83. 1818. Georgia, *Baldwin*.
- Anatherum tripsacoides* Spreng., Syst. Veg. 1: 290. 1825. Based on *Elyonurus tripsacoides* Humb. and Bonpl.
- Andropogon tripsacoides* Steud., Syn. Pl. Glum. 1: 364. 1854. Based on *Elyonurus tripsacoides* Humb. and Bonpl.
- Andropogon nuttallii* Chapm., Fl. South. U. S. 580. 1860. Based on *Rottboellia ciliata* Nutt.
- Elyonurus nuttallianus* Benth. ex Vasey, Grasses U. S. 17. 1883. Based on *Andropogon nuttallianus* [error for *nuttallii* Chapm.].
- Elyonurus nuttallii* Vasey, Grasses U. S. Descr. Cat. 25. 1885. Based on *Andropogon nuttallii* Chapm.

(40) ENNEAPOGON Desv. ex Beauv.

- (1) **Enneapogon desvauxii** Beauv., Ess. Agrost. 82, 161. pl. 16. f. 11. 1812; ex Desv., Opusc. 98. 1831. Locality erroneously given as "Manilia," probably Argentina.

- Enneapogon phleoides* Roem. and Schult., Syst. Veg. 2: 616. 1817. South America.
- Pappophorum wrightii* S. Wats., Amer. Acad. Sci. Proc. 18: 178. 1883. [Devils River, Tex.], *Wright* 751 and 2029.
- Pappophorum mexicanum* Griseb. ex Fourn., Mex. Pl. 2: 133. 1886. Mexico, Guadalupe, *Bourgeau*; valley of Mexico, *Schaffner* 184.
- Enneapogon wrightii* C. E. Hubb. in Hook. f., Icon. Pl. (pl. 3337). 2. 1937. Based on *Pappophorum wrightii* S. Wats.

(14) ERAGROSTIS Beauv.

- (43) **Eragrostis acuta** Hitchc., Biol. Soc. Wash. Proc. 41: 159. 1928. Punta Rassa, Fla., *Hitchcock* 263.
- Eragrostis alba** Presl, Rel. Haenk. 1: 279. 1830. "Hab. ad Monte-Rey, Californiae. 2" The label with the type specimen bears "Regio montana," indicating that the plant came from Peru. The species is not known from the United States.
- (8) **Eragrostis amabilis** (L.) Wight and Arn. ex Nees in Hook. and Arn., Bot. Beechey Voy. 251. 1838. Based on *Poa amabilis* L.
- Poa amabilis* L., Sp. Pl. 68. 1753. India.
- Poa plumosa* Retz., Obs. Bot. 4: 20. 1786. East Indies.
- Megastachya amabilis* Beauv., Ess. Agrost. 74, 167, 173. 1812. Based on *Poa amabilis* L.
- Cynodon amabilis* Raspail, Ann. Sci. Nat., Bot. 5: 302. 1825. Based on *Megastachya amabilis* Beauv.
- Eragrostis plumosa* Link, Hort. Berol. 1: 192. 1827. Based on *Poa plumosa* Retz.
- Erochloë amabilis* Raf. ex Jacks., Ind. Kew. 1: 886. 1893, as synonym of *Eragrostis amabilis*.
- Erochloë spectabilis* Raf. ex Jacks., Ind. Kew. 1: 886. 1893, as synonym of *Eragrostis amabilis*.
- Eragrostis ciliaris* var. *patens* Chapm. ex Beal, Grasses N. Amer. 2: 479. 1896. Jesup, Ga., *Curtiss* 3493*.
- Eragrostis tenella* var. *plumosa* Stapf in Hook. f., Fl. Brit. Ind. 7: 315. 1896. Based on *Poa plumosa* Retz.
- Eragrostis amabilis* var. *plumosa* E. G. and A. Camus in Lecomte, Fl. Gen. Ind.-Chin. 7: 557. 1923. Based on *Poa plumosa* Retz.
- (29) **Eragrostis arida** Hitchc., Wash. Acad. Sci. Jour. 23: 449. 1933. Del Rio, Tex., *Hitchcock* 13650.
- (46) **Eragrostis bahiensis** Schrad. in Schult., Mantissa 2: 318. 1824. Brazil.
- (26) **Eragrostis barrelieri** Daveau in Morot., Jour. Bot. 8: 289. 1894. Southern Europe.

- Eragrostis vulgaris* subsp. *barrelieri* Douin in Bonn., Fl. Compl. 12: 32. 1927-32. Based on *E. barrelieri* Daveau.
- (5) *Eragrostis beyrichii* J. G. Smith, Mo. Bot. Gard. Rpt. 6: 117. pl. 56. 1895. "Arkansas," Beyrich in 1834, but there is no recent record from that State. In 1834 the boundaries were as at present, but earlier included parts of Texas.
- (14) *Eragrostis capillaris* (L.) Nees, Agrost. Bras. 505. 1829. Based on *Poa capillaris* L.
Poa capillaris L., Sp. Pl. 68. 1753. Canada, Kalm.
Aira capillacea Lam., Tabl. Encycl. 1: 177. 1791. Carolina, Fraser.
Poa tenuis Ell., Bot. S. C. and Ga. 1: 156. 1816. South Carolina.
Eragrostis tenuis Steud., Syn. Pl. Glum. 1: 273. 1854. Based on *Poa tenuis* Ell.
- (45) *Eragrostis chariis* (Schult.) Hitchc., Lingnan Sci. Jour. 7: 193. 1931. Based on *Poa chariis* Schult.
Poa elegans Roxb., Hort. Beng. 82. 1814. Fl. Ind. 1: 339. 1820. Not *P. elegans* Poir., 1804. India.
Poa chariis Schult., Mantissa 2: 314. 1824. Based on *P. elegans* Roxb.
Poa elegantula Kunth, Rév. Gram. 1: 114. 1829. Based on *P. elegans* Roxb.
Eragrostis elegantula Nees ex Steud., Syn. Pl. Glum. 1: 266. 1854. Not *E. elegantula* Nees, 1851. Based on *Poa elegantula* Kunth.
- Eragrostis chloromelas* Steud., Syn. Pl. Glum. 1: 271. 1854. Based on the species described under *E. atrovirens* by Nees, that name based on *Poa atrovirens* Desf., a different species.
- (24) *Eragrostis cilianensis* (All.) Lutati, Malpighia 18: 386. 1904. Based on *Poa cilianensis* All.
Briza eragrostis L., Sp. Pl. 70. 1753. Europe.
Poa cilianensis All., Fl. Pedem. 2: 246. 1785. Italy.
? *Briza caroliniana* Walt., Fl. Carol. 79. 1788. Not *B. caroliniana* Lam. South Carolina.
Poa megastachya Koel., Descr. Gram. 181. 1802. Based on *Briza eragrostis* L.
Eragrostis major Host, Icon. Gram. Austr. 4: 14. pl. 24. 1809; Fl. Austr. 1: 135. 1827. Austria.
Megastachya eragrostis Beauv. ex Roem. and Schult., Syst. Veg. 2: 575, in obs.; 584. 1817. Based on *Briza eragrostis* L.
Briza purpurascens Muhl., Descr. Gram. 154. 1817. Carolina.
Poa obtusa Nutt., Gen. Pl. 1: 67. 1818. Not *P. obtusa* Muhl., 1817. Philadelphia, Barton.
Poa pennsylvanica Nutt., Gen. Pl. 2: errata. 1818. Based on *P. obtusa* Nutt.
Poa philadelphica Barton, Compend. Fl. Phila. 1: 62. 1818. Based on *P. obtusa* Nutt.
- Megastachya obtusa* Schult., Mantissa 2: 326. 1824. Based on *Poa obtusa* Nutt.
Megastachya purpurascens Schult., Mantissa 2: 326. 1824. Based on *Briza purpurascens* Muhl.
Poa nuttallii Spreng., Syst. Veg. 1: 344. 1825. Based on *P. obtusa* Nutt.
Calotheca purpurascens Spreng., Syst. Veg. 1: 348. 1825. Based on *Briza purpurascens* Muhl.
Eragrostis megastachya Link, Hort. Berol. 1: 187. 1827. Based on *Poa megastachya* Koel.
Briza megastachya Steud., Nom. Bot. ed. 2. 1: 225. 1840, as synonym of *Poa megastachya* Koel.
Eragrostis vulgaris var. *megastachya* Coss. and Germ., Fl. Env. Paris 2: 641. 1845. Based on *Poa megastachya* Koel.
Eragrostis poaeoides var. *megastachya* A. Gray, Man. ed. 2. 563. 1856. Based on *E. megastachya* Link.
Eragrostis virletii Fourn., Mex. Pl. 2: 116. 1886. San Luis Potosí, Mexico, Virlet 1391.
Eragrostis eragrostis MacM., Met. Minn. Vall. 75. 1892. Not *E. eragrostis* Beauv., 1812. Based on *Briza eragrostis* L.
Eragrostis megastachya var. *cilianensis* Aschers. and Graebn., Syn. Mitteleur. Fl. 2: 371. 1900. Based on *Poa cilianensis* All.
Eragrostis minor var. *megastachya* Davy in Jepson, Fl. West Mid. Calif. 60. 1901. Based on *E. megastachya* Link.
Erosion ciliare Lunell, Amer. Midl. Nat. 4: 221. 1915. Lunell cites "*Eragrostis ciliaris* (All.) Link" as basis. Reference to "Hubbard, Philippine Jour. Sci. Bot. 8: 159-161. 1913" and the fact that this name is included in a list of plants of North Dakota indicate that Lunell meant *Eragrostis cilianensis* (All.) Lutati, rather than *E. ciliaris* (L.) Link.
Eragrostis eragrostis var. *megastachya* Farwell, Mich. Acad. Sci. Rpt. 17: 182. 1916. Based on *Poa megastachya* Koel.
? *Eragrostis eragrostis* subvar. *leersioides* Farwell, Amer. Midl. Nat. 10: 306. 1927. Based on *E. multiflora* var. *leersioides* Richt., this based on *Megastachya leersioides* Presl, described from Sicily, the description not applying to American forms.
- (7) *Eragrostis ciliaris* (L.) R. Br. in Tuckey, Narr. Exp. Congo App. 478. 1818. Based on *Poa ciliaris* L.
Poa ciliaris L., Syst. Nat. ed. 10. 2: 875. 1759. Jamaica.
Megastachya ciliaris Beauv., Ess. Agrost. 74, 167, 174, 1812. Based on *Poa ciliaris* L.
Eragrostis villosa Trin., Fund. Agrost. 137. 1820. Based on *Poa ciliaris* L.
Cynodon ciliaris Raspail, Ann. Sci. Nat.,

- Bot. 5: 302. 1825. Based on *Megastachya ciliaris* Beauv.
- Macroblepharus contractus* Phil., Linnaea 19: 101. 1858. Chile, Gay 129.
- Eragrostis ciliaris* var. *laxa* Kuntze, Rev. Gen. Pl. 2: 774. 1891. West Indies.
- (3) *Eragrostis curtipedicellata* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 97. 1862. Northern Texas, Buckley.
- Eragrostis brevipedicellata* A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 336. 1862, as synonym of *E. curtipedicellata* Buckl.
- Eragrostis viscosa* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 11: 51. pl. 7. 1898. Not *E. viscosa* Trin., 1830. Midland, Tex., J. G. Smith.
- (47) *Eragrostis curvula* (Schrud.) Nees, Fl. Afr. Austr. 397. 1841. Based on *Poa curvula* Schrad.
- Poa curvula* Schrad., Gött. Anz. Ges. Wiss. 3: 2073. 1821. Cape of Good Hope.
- Eragrostis cyperoides* (Thunb.) Beauv., Ess. Agrost. 71, 162, 174. 1812. Based on *Poa cyperoides* Thunb.
- Poa cyperoides* Thunb., Prodr. Pl. Cap. 22. 1794. South Africa, Thunberg.
- (19) *Eragrostis diffusa* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 97. 1862. Northern Texas, Buckley.
- Eragrostis purshii* var. *delicatula* Munro ex Scribn., Torrey Bot. Club Bul. 10: 30. 1883. Name only. Arizona, Pringle.
- Eragrostis purshii* var. *diffusa* Vasey, U. S. Natl. Herb. Contrib. 1: 59. 1890. Based on *E. diffusa* Buckl.
- (42) *Eragrostis elliottii* S. Wats., Amer. Acad. Sci. Proc. 25: 140. 1890. Based on *Poa nitida* Ell.
- Poa nitida* Ell., Bot. S. C. and Ga. 1: 162. 1816. Not *P. nitida* Lam., 1791. South Carolina.
- Eragrostis nitida* Chapm., Fl. South. U. S. 564. 1860. Not *E. nitida* Link, 1827. Based on *Poa nitida* Ell.
- Eragrostis macropoda* Pilger in Urban, Symb. Antill. 4: 106. 1903. Puerto Rico, Sitenis 1233.
- (33) *Eragrostis erosa* Scribn. in Beal, Grasses N. Amer. 2: 483. 1896. Chihuahua, Mexico, Pringle 415.
- (15) *Eragrostis frankii* C. A. Meyer ex Steud., Syn. Pl. Glum. 1: 273. 1854. Ohio, Frank.
- Poa parviflora* Nutt., Gen. Pl. 1: 67. 1818. Not *P. parviflora* R. Br. [United States].
- Poa micrantha* Schult., Mantissa 2: 305. 1824. Not *Eragrostis micrantha* Hack. 1895. Based on *P. parviflora* Nutt.
- Eragrostis erythrogona* Nees in Steud., Syn. Pl. Glum. 1: 273. 1854. St. Louis, Drummond.
- Eragrostis capillaris* var. *frankii* Farwell, Mich. Acad. Sci. Rpt. 17: 182. 1916. Based on *E. frankii* "Steud."
- Eragrostis frankii* var. *brevipes* Fassett, Rhodora 34: 95. 1932. Glenhaven, Wis., Fassett 12899.
- (9) *Eragrostis glomerata* (Walt.) L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 543. 1894. Based on *Poa glomerata* Walt.
- Poa glomerata* Walt., Fl. Carol. 80. 1788. South Carolina.
- Poa conferta* Ell., Bot. S. C. and Ga. 1: 158. 1816. South Carolina.
- Megastachya glomerata* Schult., Mantissa 2: 327. 1824. Based on *Poa glomerata* Walt.
- Poa walteri* Kunth, Rév. Gram. 1: 116. 1829. Based on *P. glomerata* Walt.
- Eragrostis conferta* Trin., Acad. St. Pétersb. Mém. VI. Math. Phys. Nat. 1: 409. 1830. Based on *Poa conferta* Ell.
- Eragrostis pallida* Vasey, U. S. Natl. Herb. Contrib. 1: 285. 1893. Colima, Mexico, Palmer 1268.
- (30) *Eragrostis hirsuta* (Michx.) Nees, Agrost. Bras. 508. 1829. Based on *Poa hirsuta* Michx.
- ?*Poa simplex* Walt., Fl. Carol. 79. 1788. Not *Eragrostis simplex* Scribn., 1900. South Carolina.
- Poa hirsuta* Michx., Fl. Bor. Amer. 1: 68. 1803. South Carolina, Michaux.
- Eragrostis sporoboloides* Smith and Bush, Mo. Bot. Gard. Rpt. 6: 116. pl. 54. 1895. Sapulpa, Indian Territory [Okla.], Bush [766].
- Eragrostis hirsuta* var. *laevivaginata* Fernald, Rhodora 41: 500. 1939. Southampton County, Va., Fernald and Long 9273.
- (11) *Eragrostis hypnoides* (Lam.) B. S. P., Prel. Cat. N. Y. 69. 1888. Based on *Poa hypnoides* Lam.
- Poa hypnoides* Lam., Tabl. Encycl. 1: 185. 1791. Tropical America.
- Megastachya hypnoides* Beauv., Ess. Agrost. 74, 167, 175. 1812. Based on *Poa hypnoides* Lam.
- Poa reptans* var. *caespitosa* Torr., Fl. North. and Mid. U. S. 1: 115. 1823. New Jersey.
- Neeragrostis hypnoides* Bush, Acad. Sci. St. Louis, Trans. 13: 180. 1903. Based on *Poa hypnoides* Lam.
- Erosion hypnoides* Lunell, Amer. Midl. Nat. 4: 221. 1915. Based on *Poa hypnoides* Lam.
- (35) *Eragrostis intermedia* Hitchc., Wash. Acad. Sci. Jour. 23: 450. 1933. San Antonio, Tex., Hitchcock 5491.
- Eragrostis lehmanniana* Nees, Fl. Afr. Austr. 402. 1841. South Africa, Drege.
- (31) *Eragrostis lugens* Nees, Agrost. Bras. 505. 1829. Brazil.
- Poa lugens* Kunth, Rév. Gram. 1: Sup. 28. 1830. Based on *Eragrostis lugens* Nees.
- (23) *Eragrostis lutescens* Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 9: 7. 1899. Almota, Wash., Piper 2624.

- (28) *Eragrostis mexicana* (Hornem.) Link, Hort. Berol. 1: 190. 1827. Based on "*Poa mexicana* Lag. Hornem."
- Poa mexicana* Hornem., Hort. Hafn. 2: 953. 1815. Garden specimen from Mexican seed.
- Poa mexicana* Lag., Gen. et Sp. Nov. 3. 1816. Grown in Madrid from Mexican seed.
- Small specimens of this species have been referred to *Eragrostis limbata* Fourn., a Mexican species, not known from the United States.
- (21) *Eragrostis multicaulis* Steud., Syn. Pl. Glum. 1: 426. 1855. Japan.
- Eragrostis pilosa* var. *damiensiana* Bonnet, Naturaliste 3: 412. 1881. France.
- Eragrostis pilosa* var. *condensata* Hack., Allg. Bot. Ztschr. 7: 13. 1901. Karlsruhe, Germany, Kneucker Gram. Exs. 115.
- Eragrostis peregrina* Wiegand, Rhodora 19: 95. 1917. Based on *E. pilosa* var. *condensata* Hack.
- Eragrostis damiensiana* Thell., Repert. Sp. Nov. Fedde 24: 323. 1928. Based on *E. pilosa* var. *damiensiana* Bonnet.
- Eragrostis damiensiana* var. *condensata* Thell., Repert. Sp. Nov. Fedde 24: 328. 1928. Based on *E. pilosa* var. *condensata* Hack.
- (27) *Eragrostis neomexicana* Vasey, U. S. Natl. Herb. Contrib. 2: 542. 1894. New Mexico, Vasey.
- Eragrostis obtusa* Munro ex Stapf, in Dyer, Fl. Cap. 7: 625. 1898. South Africa.
- (1) *Eragrostis obtusiflora* (Fourn.) Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 8: 10. pl. 5. 1897. Based on *Brizopyrum obtusiflorum* Fourn.
- Brizopyrum obtusiflorum* Fourn., Mex. Pl. 2: 120. 1886. Orizaba, Mexico, Émy.
- (22) *Eragrostis orcuttiana* Vasey, U. S. Natl. Herb. Contrib. 1: 269. 1893. San Diego, Calif., Orcutt 1313.
- (4) *Eragrostis oxylepis* (Torr.) Torr., U. S. Expl. Miss. Pacif. Rpt. 4: 156. 1857. Based on *Poa oxylepis* Torr.
- Poa interrupta* Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 146. 1837. Not *P. interrupta* Lam., 1791. Banks of the Arkansas [Nuttall].
- Poa oxylepis* Torr. in Marcy, Expl. Red Riv. 301. 1853. Based on *Poa interrupta* Nutt.
- Eragrostis veraecrucis* Rupr., Acad. Sci. Brux. Bul. 9^e: 235. 1842, name only; Fourn., Mex. Pl. 2: 118. 1886, as synonym of *Megastachya oxylepis* var. *capitata* Fourn.
- Megastachya oxylepis* Fourn., Mex. Pl. 2: 118. 1886. Based on *Poa oxylepis* Torr.
- Megastachya oxylepis* var. *capitata* Fourn., Mex. Pl. 2: 118. 1886. Vera Cruz, Mexico.
- Eragrostis interrupta* Trel. in Branner and Coville, Ann. Rpt. Geol. Survey Ark. 4: 237. 1891. Not *E. interrupta* Beauv., 1812. Based on *Poa interrupta* Nutt.
- Referred to *Eragrostis secundiflora* Presl in Manual ed. 1. That is a rare Mexican species not known from the United States.
- (34) *Eragrostis palmeri* S. Wats., Amer. Acad. Sci. Proc. 18: 182. 1883. Juarez, Coahuila, Palmer 1368.
- Eragrostis caudata* Fourn., Mex. Pl. 2: 115. 1886. Not *E. caudata* Nees ex Steud. 1854. Mexico, Berlandier 2345.
- (18) *Eragrostis pectinacea* (Michx.) Nees, Fl. Afr. Austr. 406. 1841. Based on *Poa pectinacea* Michx., the name given as "*Er. pectinacea* Michx."
- Poa pectinacea* Michx., Fl. Bor. Amer. 1: 69. 1803. Illinois, Michaux.
- Poa eragrostis* Ell., Bot. S. C. and Ga. 1: 161. 1816. Not *P. eragrostis* L., 1753. South Carolina and Georgia.
- Poa tenella* Nutt., Gen. Pl. 1: 67. 1818. Not *P. tenella* L., 1753. North America.
- Eragrostis brizoides* Schult., Mantissa 2: 319. 1824. Based on *Poa tenella* Nutt.
- Poa nuttallii* Kunth, Rév. Gram. 1: 116. 1829. Not *P. nuttallii* Spreng., 1825. Based on *Poa tenella* Nutt.
- Eragrostis purshii* Schrad., Linnaea 12: 451. 1838. North America; description inadequate; Gray, Man. ed. 2. 564. 1856.
- Poa diandra* Schrad., Linnaea 12: 451. 1838, as synonym of *Eragrostis purshii* Schrad.
- Eragrostis nuttalliana* Steud., Nom. Bot. ed. 2. 1: 563. 1840. Based on *Poa tenella* Nutt.
- Eragrostis pennsylvanica* Scheele, Flora 27: 58. 1844. Pennsylvania.
- Eragrostis unionis* Steud., Syn. Pl. Glum. 1: 273. 1854. Miami, Ohio.
- Eragrostis cognata* Steud., Syn. Pl. Glum. 1: 273. 1854. Ohio.
- (17) *Eragrostis perplexa* L. H. Harvey, Univ. Microfilms, Publ. 967: 194. 1948. Mellette County, S. Dak., W. L. Tolstead, Aug. 30, 1935.
- (40) *Eragrostis pilifera* Scheele, Linnaea 22: 344. 1849. New Braunfels, Tex., Lindheimer.
- Eragrostis grandiflora* Smith and Bush, Mo. Bot. Gard. Rpt. 6: 117. pl. 55. 1895. Sapulpa, Indian Territory [Okla.], Bush [808].
- Eragrostis trichodes* var. *pilifera* Fernald, Rhodora 40: 331. 1938. Based on *E. pilifera* Scheele.
- (16) *Eragrostis pilosa* (L.) Beauv., Ess. Agrost. 71, 162, 175. 1812. Based on *Poa pilosa* L.
- Poa pilosa* L., Sp. Pl. 68. 1753. Italy.
- Poa eragrostis* Walt., Fl. Carol. 80. 1788. Not *P. eragrostis* L., 1753. South Carolina.
- ?*Poa tenella* [L. misapplied by] Pursh, Fl. Amer. Sept. 1: 80. 1814. New Jersey to Carolina. Elliott (Bot. S. C. and Ga. 1:

160. 1816) follows Pursh. According to Merrill (U. S. Dept. Agr., Div. Agrost. Cir. 29: 11. 1901) Elliott's plant is *E. pilosa*.
- Eragrostis filiformis* Link, Hort. Berol. 1: 191. 1827. North America.
- Poa linkii* Kunth, Rév. Gram. 1: 113. 1829. Based on *Eragrostis filiformis* Link.
- Eragrostis linkii* Steud., Syn. Pl. Glum. 1: 273. 1854. Based on *Poa linkii* Kunth.
- (25) *Eragrostis poaeoides* Beauv., Ess. Agrost. 162. 1812, name only; ex Roem. and Schult., Syst. Veg. 2: 574. 1817. Based on *Poa eragrostis* L. (Spelled *pooides* by Hylander, Uppsala Univ. Årskr. 7: 71. 1945.)
- Poa eragrostis* L., Sp. Pl. 68. 1753. Italy.
- Eragrostis minor* Host, Icon. Gram. Austr. 4: 15. 1809 [name untenable because the genus was not validly published until 1812]; Fl. Austr. 1: 135. 1827. Based on *Poa eragrostis* L.
- Eragrostis eragrostis* Beauv., Ess. Agrost. 71, 174. pl. 14. f. 11. 1812. Based on *Poa eragrostis* L.
- Eragrostis poaeiformis* Link, Hort. Berol. 1: 188. 1827. Based on *Poa eragrostis* L.
- Eragrostis vulgaris* Presl ex Steud., Nom. Bot. ed. 2. 1: 564. 1840, as synonym of *E. poaeiformis* Link.
- Eragrostis vulgaris* Coss. and Germ., Fl. Env. Paris 2: 641. 1845. Based on "*Poa eragrostis* et *Briza eragrostis* L.," the two species named var. *microstachya* and *megastachya*, respectively.
- Eragrostis vulgaris* var. *microstachya* Coss. and Germ., Fl. Env. Paris 2: 641. 1845. Based on *Poa eragrostis* L.
- Eragrostis eragrostis* var. *microstachya* Farwell, Amer. Midl. Natl. 10: 306. 1927. Based on *E. vulgaris* var. *microstachya* Coss. and Germ.
- Eragrostis vulgaris* subsp. *poaeoides* Douin in Bonn., Fl. Compl. 12: 32. 1927-32. Based on *E. poaeoides* Beauv.
- (44) *Eragrostis refracta* (Muhl.) Scribn., Torrey Bot. Club Mem. 5: 49. 1894. Based on *Poa refracta* Muhl.
- ?*Poa virginica* Zucc. ex Roemer, Col. Bot. 1: 124. 1809. Virginia.
- Poa refracta* Muhl. ex Ell., Bot. S. C. and Ga. 1: 162. 1816. South Carolina. Name only, Muhl., Cat. Pl. 12. 1813.
- Eragrostis campestris* Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 2¹: 72. 1836. North America.
- Eragrostis longeradiata* Steud., Syn. Pl. Glum. 1: 272. 1854. Carolina, Curtis.
- ?*Eragrostis virginica* Steud., Syn. Pl. Glum. 1: 273. 1854. Based on *Poa virginica* Zucc.
- Eragrostis pectinacea* var. *refracta* Chapm., Fl. South. U. S. 564. 1860. Based on *Poa refracta* Muhl.
- Eragrostis campestris* var. *refracta* Chapm., Fl. South. U. S. ed. 3. 617. 1897. Based on *Poa refracta* Muhl.
- Poa reflexa* Ell. ex Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 27: 5. 1900, as synonym of *Eragrostis refracta* Scribn.
- This species was described under the name *Poa capillaris* L., in Michx., Fl. Bor. Amer. 1: 67. 1803.
- (10) *Eragrostis reptans* (Michx.) Nees, Agrost. Bras. 514. 1829. Based on *Poa reptans* Michx.
- Poa reptans* Michx., Fl. Bor. Amer. 1: 69. pl. 11. 1803. Illinois, Michaux.
- Poa dioica* Michx. ex Poir. in Lam., Encycl. 5: 87. 1804, erroneously cited as synonym of *P. hypnoides* Lam. Kaskaskia River, Ill., Michaux.
- Megastachya reptans* Beauv., Ess. Agrost. 74, 167, 175. 1812. Based on *Poa reptans* Michx.
- Poa weigeltiana* Reichenb. ex Trin., Acad. St. Pétersb. Mém. VI. Math. Phys. Nat. 1: 410. 1830, as synonym of *Eragrostis reptans* Nees. Dutch Guiana, Weigelt.
- Poa dioica* Vent. ex Kunth, Enum. Pl. 1: 336. 1833, as synonym of *P. reptans* Michx.
- Poa capitata* Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 146. 1837. Arkansas River, Nuttall.
- Eragrostis capitata* Nash in Britton, Man. 1042. 1901. Based on *Poa capitata* Nutt.
- Neeragrostis weigeltiana* Bush, Acad. Sci. St. Louis, Trans. 13: 178. 1903. Based on *Poa weigeltiana* Reichenb.
- Eragrostis weigeltiana* Bush, Acad. Sci. St. Louis, Trans. 13: 180. 1903. Based on *Poa weigeltiana* Reichenb.
- (2) *Eragrostis sessilispica* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 97. 1862. Austin, Tex., Buckley.
- Diplachne rigida* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 12²: pl. 44. 1891. Texas [type, Reverchon in 1879], and New Mexico, northward to Kansas.
- Leptochloa rigida* Munro ex Vasey, U. S. Dept. Agr., Div. Bot. Bul. 12²: pl. 44. 1891, as synonym of *Diplachne rigida* Vasey.
- Eragrostis rigida* Scribn., Acad. Nat. Sci. Phila. Proc. 1891: 304. 1891. Based on *Diplachne rigida* Vasey.
- Acamptoclados sessilispicus* Nash in Small, Fl. Southeast. U. S. 140. 1903. Based on *Eragrostis sessilispica* Buckl.
- (38) *Eragrostis silveana* Swallen, Amer. Jour. Bot. 19: 438. f. 3. 1932. Taft, Tex., *Silveus* 360.
- (12) *Eragrostis simplex* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 7 (ed. 3): 250. f. 244. 1900. Florida, Curtiss 6073.
- Eragrostis brownei* Kunth ex Chapm., Fl. South. U. S. ed. 2. 664. 1883. Not *E. brownei* Nees, 1841. East Florida,

Garber. (Chapman probably had *E. brownei* (Kunth) Nees, an Australian species, in mind, but he cites nothing that can connect his publication with that. The name *E. brownei* Nees is used for *E. simplex* by Scribner (U. S. Dept. Agr., Div. Agrost. Bul. 7: 262. 1897.)

- (41) *Eragrostis spectabilis* (Pursh) Steud., Nom. Bot. ed. 2. 1: 564. 1840. Based on *Poa spectabilis* Pursh.

?*Poa amabilis* Walt., Fl. Carol. 80. 1788. Not *P. amabilis* L., 1753. South Carolina.

Poa spectabilis Pursh, Fl. Amer. Sept. 1: 81. 1814. New York to Carolina.

Megastachya spectabilis Roem. and Schult., Syst. Veg. 2: 589. 1817. Based on *Poa spectabilis* Pursh.

Poa hirsuta var. *spectabilis* Torr., Fl. North. and Mid. U. S. 1: 114. 1823. Based on *Poa spectabilis* Pursh.

?*Eragrostis velutina* Schrad., Linnaea 12: 451. 1838. Carolina.

?*Poa villosa* Beyr. ex Schrad., Linnaea 12: 451. 1838, as synonym of *E. velutina* Schrad.

Eragrostis geyeri Steud., Syn. Pl. Glum 1: 272. 1854. Illinois, Geyer.

Poa pectinacea Geyer ex Steud., Syn. Pl. Glum. 1: 272. 1854. Not *P. pectinacea* Michx., 1803. As synonym of *Eragrostis geyeri* Steud.

Eragrostis pectinacea var. *spectabilis* A. Gray, Man. ed. 2. 565. 1856. Based on *Poa spectabilis* Pursh.

Erechloë spectabilis Raf. ex Jacks., Ind. Kew. 1: 886. 1893.

Eragrostis spectabilis var. *sparsihirsuta* Farwell, Amer. Midl. Nat. 10: 306. 1927. Michigan.

This is the species called *Poa pectinacea* Michx. and *Eragrostis pectinacea* Nees by American authors, not Michaux's species.

- (6) *Eragrostis spicata* Vasey, Bot. Gaz. 16: 146. 1891. Baja California, Brandegee.

Sporobolus tenuispica Hack., Repert. Sp. Nov. Fedde 6: 344. 1909. Pilcomayo River, Paraguay, Rojas 258.

Eragrostis stenophylla Hochst. ex Miquel, An. Bot. Ind. 2: 27. 1851. Asia.

- (36) *Eragrostis swallenii* Hitchc., Wash. Acad. Sci. Jour. 23: 451. 1933. Riviera, Tex., Swallen 1847.

Eragrostis tef (Zuccagni) Trotter, Soc. Bot. Ital. Bul. 1918: 62. 1918. Based on *Poa tef* Zuccagni.

Poa tef Zuccagni, Diss. Concern. l'Ist. Pianta Paniz. Abiss. 1775. Abyssinia (no page).

Poa abyssinica Jacq., Misc. Austr. 2: 364. 1781. Abyssinia.

Eragrostis abyssinica Link, Hort. Berol. 1: 192. 1827. Based on *Poa abyssinica* Jacq.

- (20) *Eragrostis tephrosanthos* Schult., Mantissa 2: 316. 1824. Martinique, Sieber.

Poa tephrosanthos Spreng. ex Schult., Mantissa 2: 316. 1824, as synonym of *Eragrostis tephrosanthos* Schult.

Eragrostis delicatula Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 2¹: 73. 1836. Brazil.

Eragrostis pilosa var. *delicatula* Hack. in Stuck., An. Mus. Nac. Buenos Aires 11: 133. 1904. Based on *E. delicatula* Trin.

- (37) *Eragrostis tracyi* Hitchc., Amer. Jour. Bot. 21: 130. f. 1. 1934. Sanibel Island, Fla., Tracy 7168.

(32) *Eragrostis trichocolea* Hack. and Arech., An. Mus. Nac. Montevideo 1: 444. 1896. Uruguay.

Eragrostis floridana Hitchc., Amer. Jour. Bot. 2: 308. 1915. Tampa, Fla., Curtiss 3494*.

- (39) *Eragrostis trichodes* (Nutt.) Wood, Class-book ed. 1861. 796. 1861. Based on *Poa trichodes* Nutt.

Poa trichodes Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 146. 1837. Arkansas, Nuttall.

Eragrostis tenuis var. *texensis* Vasey, U. S. Natl. Herb. Contrib. 1: 59. 1890. Texas, Nealley.

Eragrostis tenuis A. Gray, Man. ed. 6. 661. 1890. Not *E. tenuis* Steud., 1854. Ohio to Illinois, Kansas and southward.

Eragrostis capillacea Jedd., Bot. Archiv Mez 5: 196. 1924. Nebraska, Rydberg 1832.

- (13) *Eragrostis unioides* (Retz.) Nees in Steud., Syn. Pl. Glum. 1: 264. 1854. Based on *Poa unioides* Retz.

Poa unioides Retz., Obs. Bot. 5: 19. 1789. East Indies.

Eragrostis virescens Presl, Rel. Haenk. 1: 276. 1830. Chile, Haenke.

Eremochloa ciliaris (L.) Merr., Philippine Jour. Sci. 1 (Sup. 5): 331. 1906. Based on *Nardus ciliaris* L.

Nardus ciliaris L. Sp. Pl. 53. 1753. India.

Eremochloa ophiuroides (Munro) Hack. in DC., Monogr. Phan. 6: 261. 1889. Based on *Ischaemum ophiuroides* Munro.

Ischaemum ophiuroides Munro, Amer. Acad. Sci. Proc. 4: 363. 1860. Southern China.

(151) ERIANTHUS Michx.

- (3) *Erianthus alopecuroides* (L.) Ell., Bot. S. C. and Ga. 1: 38. 1816. Based on *Andropogon alopecuroides* L.

Andropogon divaricatus L., Sp. Pl. 1045. 1753. Virginia [Clayton 70].

Andropogon alopecuroides L., Sp. Pl. 1045. 1753. Virginia [Clayton 601].

Saccharum alopecuroides Nutt., Gen. Pl. 1: 60. 1818. Based inferentially on *Erianthus alopecuroides* Ell.

Erianthus divaricatus Hitchc., U. S. Natl.

- Herb. Contrib. 12: 125. 1908. Based on *Andropogon divaricatus* L.
- ERIANTHUS ALOPECUROIDES var. HIRSUTIS Nash in Small, Fl. Southeast. U. S. 55. 1903. Florida [Chapman]. (Published as *E. alopecuroides hirsutus*.)
- (4) *Erianthus brevibarbis* Michx., Fl. Bor. Amer. 1: 55. 1803. "Tennessee and Carolina," Michaux. The only specimen in the Michaux Herbarium bearing this name is from dry hills 5 days distant from the Wabash River toward the mouth of the Missouri, that is, in southern Illinois, where it has not since been found.
- Saccharum brevibarbe* Pers., Syn. Pl. 1: 103. 1805. Based on *Erianthus brevibarbis* Michx.
- Calamagrostis rubra* Bosc ex Kunth, Enum. Pl. 1: 478. 1833, as synonym of *Erianthus brevibarbis* Michx.
- Erianthus alopecuroides* var. *brevibarbis* Chapm., Fl. South U. S. 583. 1860. Based on *E. brevibarbis* Michx.
- Erianthus saccharoides* subsp. *brevibarbis* Hack. in DC., Monogr. Phan. 6: 131. 1889. Based on *E. brevibarbis* Michx.
- (5) *Erianthus coarctatus* Fernald, Rhodora 45: 246. pl. 758. 1943. Homeville, Sussex County, Va., Fernald and Long 7301.
- ERIANTHUS COARCTATUS var. ELLIOTTIANUS Fernald, Rhodora 45: 246. 1943. Live Oak, Fla., Curtiss 6940.
- (2) *Erianthus contortus* Baldw. ex Ell., Bot. S. C. and Ga. 1: 40. 1816. Savannah, Ga., Baldwin.
- Saccharum contortum* Nutt., Gen. Pl. 1: 60. 1818. Based on *Erianthus contortus* Ell.
- Erianthus alopecuroides* var. *contortus* Chapm., Fl. South. U. S. 582. 1860. Based on *E. contortus* Ell.
- Erianthus saccharoides* subsp. *contortus* Hack. in DC., Monogr. Phan. 6: 131. 1889. Based on *E. contortus* Ell.
- Erianthus smallii* Nash, N. Y. Bot. Gard. Bul. 1: 429. 1900. Stone Mountain, Ga., Small in 1894.
- (6) *Erianthus giganteus* (Walt.) Muhl., Cat. Pl. 4. 1813. Based on *Anthoxanthum giganteum* Walt. Later (Descr. Gram. 192. 1817) Muhlenberg uses the name for both *E. saccharoides* and *E. alopecuroides* (his herbarium specimen under this name including both species), but the description (awn twisted) applies better to *E. alopecuroides*. *Erianthus giganteus* was published as new by Hubbard (Rhodora 14: 166. 1912) based on *Anthoxanthum giganteum* Walt.
- Anthoxanthum giganteum* Walt., Fl. Carol. 65. 1788. South Carolina.
- Erianthus saccharoides* Michx., Fl. Bor. Amer. 1: 55. 1803. Carolina to Florida, Michaux.
- Saccharum giganteum* Pers., Syn. Pl. 1: 103. 1805. Based on *Anthoxanthum giganteum* Walt.
- Saccharum erianthoides* Raspail, Ann. Sci. Nat., Bot. 5: 308. 1825. Based on *Erianthus saccharoides* Rich. [same as Michx.].
- Andropogon erianthus* Link, Hort. Berol. 1: 243. 1827. Based on *Erianthus saccharoides* Michx.
- Erianthus saccharoides* var. *michauxii* Hack. in Mart., Fl. Bras. 2³: 257. 1883. Based on *E. saccharoides* Michx.
- Erianthus compactus* Nash, Torrey Bot. Club Bul. 22: 419. 1895. New Jersey to North Carolina and Tennessee [type, Washington, D. C., Nash in 1895].
- Erianthus latus* Nash, Torrey Bot. Club Bul. 24: 344. 1897. Near Paola, Fla., Swingle 1732a.
- Erianthus tracyi* Nash, Torrey Bot. Club Bul. 24: 37. 1897. Starkville, Miss., Tracy in 1896.
- Erianthus saccharoides* var. *compactus* Fernald, Rhodora 45: 252. 1943. Based on *E. compactus* Nash.
- Erianthus ravennae* (L.) Beauv., Ess. Agrost. 14, 162, 177. 1812. Based on *Saccharum ravennae* Murr., this based on *Andropogon ravennae* L.
- Andropogon ravennae* L., Sp. Pl. ed. 2. 2: 1481. 1763. Italy.
- Saccharum ravennae* Murr. in L., Syst. Veg. ed., 13. 88. 1774. Based on *Andropogon ravennae* L.
- Ripidium ravennae* Trin., Fund. Agrost. 169. 1820. Based on *Saccharum ravennae* Murr.
- ERIANTHUS RAVENNAE var. PURPURASCENS (Anderss.) Hack. in DC., Monogr. Phan. 6: 140. 1889. Based on *E. purpurascens* Anderss.
- Erianthus purpurascens* Anderss., Svenska Vetensk. Akad. Öfversigt af Förhandl. 12: 161. 1855. India, Hugel.
- (1) *Erianthus strictus* Baldw. in Ell., Bot. S. C. and Ga. 1: 39. 1816. Savannah, Ga., Baldwin.
- Saccharum strictum* Nutt., Gen. Pl. 1: 60. 1818. Based on *Erianthus strictus* Baldw.
- Saccharum baldwinii* Spreng., Syst. Veg. 1: 282. 1825. Based on *Erianthus strictus* Baldw.
- Pollinia dura* Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 2¹: 91. 1836. Carolina.
- Andropogon durus* Steud., Nom. Bot. ed. 2. 1: 91. 1840. Based on *Pollinia dura* Trin.
- (132) ERIOCHLOA H. B. K.
- (1) *Eriochloa aristata* Vasey, Torrey Bot. Club Bul. 13: 229. 1886. Southwest Chihuahua, Palmer in 1885 [110e].

- Eriochloa punctata* var. *aristata* Jones, West. Bot. Contrib. 14: 11. 1912. Based on *E. aristata* Vasey.
- (6) *Eriochloa contracta* Hitchc., Biol. Soc. Wash. Proc. 41: 163. 1928. Based on *Helopus mollis* C. Muell. *Helopus mollis* C. Muell., Bot. Ztg. 19: 314. 1861. Not *Eriochloa mollis* Kunth, 1829. Texas, *Drummond* 370.
- (5) *Eriochloa gracilis* (Fourn.) Hitchc., Wash. Acad. Sci. Jour. 23: 455. 1933. Based on *Helopus gracilis* Fourn. *Helopus gracilis* Fourn., Mex. Pl. 2: 13. 1886. Oaxaca, Mexico, *Liebmman* 436.
- ERIOCHLOA GRACILIS var. MINOR (Vasey) Hitchc., Wash. Acad. Sci. Jour. 23: 456. 1933. Based on *E. punctata* var. *minor* Vasey.
- Eriochloa punctata* var. *minor* Vasey, U. S. Natl. Herb. Contrib. 3: 21. 1892. Texas, *Wright* 2087, *Nealley*.
- Eriochloa texana* Mez, Bot. Jahrb. 56: Beibl. 125: 12. 1921. [El Paso] Tex., *Jones* 4177.
- (3) *Eriochloa lemmoni* Vasey and Scribn., Bot. Gaz. 9: 185. pl. 2. 1884. [Huachuca Mountains], Ariz., *Lemmon* 2910.
- (8) *Eriochloa michauxii* (Poir.) Hitchc., U. S. Natl. Herb. Contrib. 12: 147. 1908. Based on *Panicum michauxii* Poir.
- Panicum molle* Michx., Fl. Bor. Amer. 1: 47. 1803. Not *P. molle* Swartz, 1788. Florida, *Michaux*.
- Panicum michauxii* Poir. in Lam., Encycl. Sup. 4: 278. 1816. Based on *P. molle* Michx.
- Panicum michauxianum* Schult., Mantissa 2: 227. 1824. Based on *P. molle* Michx.
- Panicum georgicum* Spreng., Syst. Veg. 1: 308. 1825. Based on *P. molle* Michx.
- Eriochloa mollis* Kunth, Rév. Gram. 1: 30. 1829. Based on *Panicum molle* Michx.
- Eriochloa mollis* var. *longifolia* Vasey, Torrey Bot. Club Bul. 13: 25. 1886. Key West, Fla., *Curtiss*.
- Eriochloa longifolia* Vasey, U. S. Natl. Herb. Contrib. 3: 21. 1892. Based on *E. mollis* var. *longifolia* Vasey.
- Eriochloa debilis* Mez, Bot. Jahrb. 56: Beibl. 125: 12. 1921. [No-name Key], Fla., *Curtiss* 3600. The same form as *E. longifolia* Vasey.
- ERIOCHLOA MICHAUXII var. SIMPSONI Hitchc., Biol. Soc. Wash. Proc. 41: 163. 1928. Cape Romano, Fla., *Simpson* 262. (Published as *E. michauxii simpsoni*.)
- (4) *Eriochloa procera* (Retz.) C. E. Hubb., Kew Bul. Misc. Inf. 1930: 256. 1930. Based on *Agrostis procera* Retz.
- Agrostis procera* Retz., Obs. Bot. 4: 19. 1786. India.
- Milium ramosum* Retz., Obs. Bot. 6: 22. 1791. Asia.
- Paspalum annulatum* Flügge, Monogr. Pasp. 133. 1810. Asia.
- Agrostis ramosa* Poir. in Lam., Encycl. Sup. 1: 257. 1810. Based on *Milium ramosum* Retz.
- Eriochloa annulata* Kunth, Rév. Gram. 1: 30. 1829. Based on *Paspalum annulatum* Flügge.
- Helopus annulatus* Nees, Agrost. Bras. 17. 1829. Based on *Paspalum annulatum* Flügge.
- Eriochloa ramosa* Kuntze, Rev. Gen. Pl. 2: 775. 1891. Based on *Milium ramosum* Retz.
- Eriochloa polystachya* var. *annulata* Maid. and Betcher, Cens. N. S. Wales Pl. 16. 1916. Based on *E. annulata* Kunth.
- Thysanolaena procera* Mez in Janow., Bot. Archiv Mez 1: 27. 1922. Based on *Agrostis procera* Retz., but misapplied to *T. maxima* (Roxb.) Kuntze.
- (7) *Eriochloa punctata* (L.) Desv. ex Hamilt., Prodr. Pl. Ind. Occ. 5. 1825. Based on *Milium punctatum* L.
- Milium punctatum* L., Syst. Nat. ed. 10. 2: 872. 1759. Jamaica.
- Agrostis punctata* Lam., Encycl. 1: 58. 1783. Based on *Milium punctatum* L.
- Paspalum punctatum* Flügge, Mongr. Pasp. 127. 1810. Based on *Milium punctatum* L.
- Piptatherum punctatum* Beauv., Ess. Agrost. 18, 173. 1812. Based on *Milium punctatum* L.
- Eriochloa kunthii* G. Meyer, Prim. Fl. Esseq. 47. 1818. British Guiana.
- Oedipachne punctata* Link, Hort. Berol. 1: 51. 1827. Based on *Milium punctatum* L.
- Helopus punctatus* Nees, Agrost. Bras. 16. 1829. Based on *Milium punctatum* L.
- Helopus kunthii* Trin. ex Steud., Nom. Bot. ed. 2. 1: 747. 1840. Based on *Eriochloa kunthii* G. Meyer.
- Monachne punctata* Nash, Torrey Bot. Club Bul. 30: 374. 1903. Based on *Milium punctatum* L.
- Eriochloa polystachya* var. *punctata* Maid. and Betcher, Cens. N. S. Wales Pl. 16. 1916. Based on *E. punctata* Desv.
- (2) *Eriochloa sericea* (Scheele) Munro in Vasey, U. S. Dept. Agr., Div. Bot. Bul. 12¹: pl. 1. 1890. Based on *Paspalum sericeum* Scheele, as shown by Munro manuscript in Kew Herbarium.
- Paspalum racemosum* Nutt., Amer. Phil. Soc. Trans. (n. s.) 5: 145. 1837. Not *P. racemosum* Lam., 1791. Red River, Ark. [Nuttall].
- Paspalum sericeum* Scheele, Linnaea 22: 341. 1849. New Braunfels, Tex., *Lindheimer*.
- Panicum sericatum* Scheele ex Steud., Syn. Pl. Glum. 1: 58. 1854. Based on *Paspalum sericeum* Scheele.
- Helopus junceus* C. Muell., Bot. Ztg. 19: 314. 1861. Texas, *Drummond* 305 and 368.
- Eriochloa villosa* (Thunb.) Kunth, Rév.

Gram. 1: 30. 1829. Based on *Paspalum villosum* Thunb.

Paspalum villosum Thunb., Fl. Jap. 45. 1784. Japan.

(167) EUCHLAENA Schrad.

- (1) *Euchlaena mexicana* Schrad., Ind. Sem. Hort. Goettingen 1832; reprinted in Linnaea 8: Litt. 25. 1833. Mexico, Muhlenfordt.

Reana luxurians Durieu, Soc. Acclim. Bul. II. 9: 581. 1872. This and the following are names only. They have, however, come into frequent use for teosinte.

Euchlaena luxurians Durieu and Aschers., Soc. Linn. Paris Bul. 1: 107. 1877. Based on *Reana luxurians* Durieu.

Euchlaena mexicana var. *luxurians* Haines, Bot. Bihar and Orissa pt. 6: 1065. 1924. Based on *Reana luxurians* "Brogn." (error for Durieu).

Zea mexicana Reeves and Mangelsd., Amer. Jour. Bot. 29: 817. 1942. Based on *Euchlaena mexicana* Schrad.

- (2) *Euchlaena perennis* Hitchc., Wash. Acad. Sci. Jour. 12: 207. 1922. Zapotlan, Jalisco, Mexico, Hitchcock 7146.

(4) FESTUCA L.

Festuca amethystina L., Sp. Pl. 74. 1753. Europe.

- (9) *Festuca arida* Elmer, Bot. Gaz. 36: 52. 1903. North Yakima, Wash., Henderson 2196.

This species was referred by Piper to *Festuca eriolepis* Desv., a South American species not known from North America.

- (33) *Festuca arizonica* Vasey, U. S. Natl. Herb. Contrib. 1: 277. 1893. Flagstaff, Ariz., Tracy 118.

Festuca ovina var. *arizonica* Hack. ex Beal, Grasses N. Amer. 2: 598. 1896. Based on *F. arizonica* Vasey.

Festuca vaseyana Hack. ex Beal, Grasses N. Amer. 2: 601. 1896. Veta Pass, Colo., Vasey.

Festuca scabrella var. *vaseyana* Hack. ex Beal, Grasses N. Amer. 2: 605. 1896. Veta Pass, Colo., Vasey.

Festuca altaica subsp. *arizonica* St. Yves, Candollea 2: 267. 1925. Based on *F. arizonica* Vasey.

Festuca arundinacea Schreb., Spic. Fl. Lips. 57. 1771. Germany.

Bromus arundinaceus Roth, Tent. Fl. Germ. 2: 141. 1789. Based on *Festuca arundinacea* Schreb.

Festuca elatior var. *arundinacea* Wimm., Fl. Schles. ed. 3. 59. 1857. Based on *F. arundinacea* Schreb.

- (25) *Festuca californica* Vasey, U. S. Natl. Herb. Contrib. 1: 277. 1893. Oakland, Calif., Bolander 1505.

Bromus kalmii var. *aristulatus* Torr., U. S.

Expl. Miss. Pacif. Rpt. 4: 157. 1856. Mark West Creek, Calif., Bigelow.

Festuca aristulata Shear ex Piper, U. S. Natl. Herb. Contrib. 10: 32. 1906. Based on *Bromus kalmii* var. *aristulatus* Torr.

Festuca aristulata parishii Piper, U. S. Natl. Herb. Contrib. 10: 33. 1906. Mill Creek Falls, San Bernardino Mountains, Calif., Parish 5036.

Festuca parishii Hitchc. in Jepson, Fl. Calif. 1: 169. 1912. Based on *F. aristulata parishii* Piper.

Festuca californica parishii Hitchc. in Abrams, Illustr. Fl. 1: 222. 1923. Based on *F. aristulata parishii* Piper.

Festuca altaica var. *aristulata* St. Yves, Candollea 2: 273. 1925. Based on *Bromus kalmii* var. *aristulatus* Torr.

- (31) *Festuca capillata* Lam., Fl. Franç. 3: 597. 1778. France.

Festuca ovina var. *capillata* Alefeld, Landw. Fl. 354. 1866. Based on *F. capillata* Lam.

- (7) *Festuca confusa* Piper, U. S. Natl. Herb. Contrib. 10: 13. pl. 1. 1906. Western Klickitat County, Wash., Suksdorf 1140.

Festuca microstachya var. *ciliata* A. Gray, Amer. Acad. Sci. Proc. 8: 410. 1872. Name only, for Hall 639 in 1871, Silver Creek, Oreg.

Festuca suksdorfii Piper in Suksdorf, Werdenda 1²: 2. 1923. Bingen, Wash., Suksdorf 5604.

- (26) *Festuca dasyclada* Hack. ex Beal, Grasses N. Amer. 2: 602. 1896. Utah, Parry in 1875.

- (4) *Festuca dertonensis* (All.) Aschers. and Graebn., Syn. Mitteleur. Fl. 2: 588. 1900. Based on *Bromus dertonensis* All. *Bromus dertonensis* All., Fl. Pedem. 2: 249. 1785. Italy.

Vulpia dertonensis Volk. in Schinz and Keller, Fl. Schweiz. ed. 2. 57 (not in Washington); Dur. and Barr., Fl. Lib. Prodr. 269. 1910. Based on *Festuca dertonensis* Aschers. and Graebn.

This is the species referred by American authors to *F. bromoides* L. That seems to be a mixture; the name is referred to *F. myuros* by European authors.

- (12) *Festuca eastwoodae* Piper, U. S. Natl. Herb. Contrib. 10: 16. 1906. Santa Lucia Mountains, Monterey County, Calif., Eastwood.

- (17) *Festuca elatior* L., Sp. Pl. 75. 1753. Europe.

Festuca pratensis Huds., Fl. Angl. 37. 1762. England.

Festuca fluitans var. *pratensis* Huds., Fl. Angl. ed. 2. 47. 1778. Based on *F. pratensis* Huds.

Avena secunda Salisb., Prodr. Stirp. 22. 1796. Based on *Festuca elatior* L.

Bromus elatior Koel., Descr. Gram. 214. 1802. Based on *Festuca elatior* L.

- Festuca poaeoides* Michx., Fl. Bor. Amer. 1: 67. 1803. St. Lawrence River, Michaux.
- Festuca poaeoides americana* Pers., Syn. Pl. 1: 94. 1805. Based on *F. poaeoides* Michx.
- Schedonorus elatior* Beauv., Ess. Agrost. 99, 156, 177. 1812. Based on *Bromus elatior* Koel.
- Schedonorus pratensis* Beauv., Ess. Agrost. 99, 163, 177. 1812. Based on *Festuca pratensis* Huds.
- Festuca americana* F. G. Dietr., Vollst. Lex. Gärt. Bot. Nachtr. 3: 332. 1817. Based on *F. poaeoides americana* Pers.
- Schedonorus americanus* Roem. and Schult., Syst. Veg. 2: 706. 1817. (Error for *Schedonorus*). Based on *Festuca poaeoides americana* Pers.
- Bromus pratensis* Spreng., Syst. Veg. 1: 359. 1825. Not *B. pratensis* Lam., 1785. Based on *Festuca pratensis* Huds.
- Bucetum pratense* Parnell, Grasses Scotl. 105. pl. 46. 1842. Based on *Festuca pratensis* Huds.
- Bucetum elatius* Parnell, Grasses Scotl. 107. pl. 46. 1842. Based on *Festuca elatior* L.
- Festuca elatior* var. *pratensis* A. Gray, Man. ed. 5. 634. 1867. Based on *F. pratensis* Huds.
- Tragus elatior* Panz. ex Jacks., Ind. Kew. 2: 1098. 1895, as synonym of *Festuca elatior* L.
- Gnomonia elatior* Lunell, Amer. Midl. Nat. 4: 224. 1915. Based on *Festuca elatior* L.
- (16) *Festuca elmeri* Scribn. and Merr., Torrey Bot. Club Bul. 29: 468. 1902. Stanford University, Calif., *Elmer* 2101.
- FESTUCA ELMERI* var. *CONFERTA* (Hack.) Hitchc., Amer. Jour. Bot. 21: 128. 1934. Based on *F. jonesii* var. *conferta* Hack.
- Festuca jonesii* var. *conferta* Hack. ex Beal, Grasses N. Amer. 2: 593. 1896. San Jose Normal School, California.
- Festuca elmeri luxurians* Piper, U. S. Natl. Herb. Contrib. 10: 38. 1906. Based on *F. jonesii* var. *conferta* Hack.
- Festuca geniculata* (L.) Cav., An. Cienc. Nat. Madrid 6: 150. 1803. Based on *Bromus geniculatus* L.
- Bromus geniculatus* L., Mant. Pl. 33. 1767. Portugal.
- Festuca gigantea* (L.) Vill., Hist. Pl. Dauph. 2: 110. 1787. Based on *Bromus giganteus* L.
- Bromus giganteus* L., Sp. Pl. 77. 1753. Europe.
- Zerna gigantea* Panz. ex Jacks., Ind. Kew. 2: 1249. 1895. Based on *Bromus giganteus* L.
- Forasaccus giganteus* Bubani, Fl. Pyr. 4: 383. 1901. Based on *Bromus giganteus* L.
- (8) *Festuca grayi* (Abrams) Piper, U. S. Natl. Herb. Contrib. 10: 14. pl. 3. 1906. Based on *F. microstachys grayi* Abrams.
- Festuca microstachys* var. *ciliata* A. Gray ex Beal, Grasses N. Amer. 2: 585. 1896. Not *F. ciliata* Gouan, 1762. Grants Pass, Oreg., Howell. Beal's specimen is a mixture of *F. grayi* and *F. confusa*, but the description applies to *F. grayi*.
- Festuca microstachys grayi* Abrams, Fl. Los Angeles 52. 1904. Based on *F. microstachys* var. *ciliata* A. Gray ex Beal.
- Festuca pacifica* var. *ciliata* Hoover, Madroño 3: 227. 1936. Based on *F. microstachys* var. *ciliata* A. Gray.
- (32) *Festuca idahoensis* Elmer, Bot. Gaz. 36: 53. 1903. Smiths Valley, Shoshone County, Idaho, *Abrams* 688.
- Festuca ovina* var. *ingrata* Hack. ex Beal, Grasses N. Amer. 2: 598. 1896. Oregon, Howell.
- Festuca ovina* var. *columbiana* Beal, Grasses N. Amer. 2: 599. 1896. [Blue Mountains], Wash., Lake.
- Festuca ovina* var. *oregona* Hack. ex Beal, Grasses N. Amer. 2: 599. 1896. Oregon, Cusick 753.
- Festuca ingrata* Rydb., Torrey Bot. Club Bul. 32: 608. 1905. Based on *F. ovina* var. *ingrata* Hack.
- Festuca ingrata nudata* Rydb., Colo. Agr. Expt. Sta. Bul. 100: 50. 1906. "*F. ovina* var. *nudata* Vasey," (herbarium name only), Colorado [*Beardslee* in 1892].
- Festuca amethystina* var. *asperrima* subvar. *idahoensis* St.-Yves, Candollea 2: 260. 1925. Based on *F. idahoensis* Elmer.
- Festuca amethystina* var. *asperrima* subvar. *robusta* St. Yves, Candollea 2: 264. 1925. Walla Walla, Wash., *Piper* 2410.
- (23) *Festuca ligulata* Swallen, Amer. Jour. Bot. 19: 436. f. 1. 1932. Guadalupe Mountains, Tex., *Moore* and *Steyermark* 3576.
- (3) *Festuca megalura* Nutt., Jour. Acad. Phila. II. 1: 188. 1848. Santa Barbara, Calif., *Gambel*.
- Vulpia megalura* Rydb., Torrey Bot. Club Bul. 36: 538. 1909. Based on *Festuca megalura* Nutt.
- (11) *Festuca microstachys* Nutt., Jour. Acad. Phila. II. 1: 187. 1848. Los Angeles, Calif., *Gambel*.
- Vulpia microstachya* Munro ex Benth., Pl. Hartw. 342. 1857. Based on *Festuca microstachys* Nutt.
- ? *Vulpia microstachya* var. *ciliata* Munro ex Benth., Pl. Hartw. 342. 1857. Name only, for *Hartweg* 281, Sacramento, Calif.
- Festuca microstachys* var. *subappressa* Suksdorf, Werdenda 1²: 3. 1923. Bingen, Wash., *Suksdorf* 6236.

- (5) *Festuca myuros* L., Sp. Pl. 74. 1753. Europe.
Avena muralis Salisb., Prodr. Stirp. 22. 1796. Based on *Festuca myuros* L.
Vulpia myuros K. Gmel., Fl. Badens. 1: 8. 1805. Based on *Festuca myuros* L.
Festuca myuros Muhl., Descr. Gram. 160. 1817. Maryland; Georgia. Probably *F. myuros* L. is referred to, Muhlenberg's specimen being a mixture of this and *F. sciurea* Nutt.
Distomomischus myuros Dulac, Fl. Haut. Pyr. 91. 1867. Based on *Vulpia myuros* K. Gmel.
Zerna myuros Panz. ex Jacks., Ind. Kew. 2: 1249. 1895, as synonym of *Festuca myuros* L.
- (20) *Festuca obtusa* Bieler, Pl. Nov. Herb. Spreng. Cent. 11. 1807. Pennsylvania, Muhlenberg. Name only, Muhl., Amer. Phil. Soc. Trans. 3: 161. 1793. Pennsylvania.
Poa laxa Lam., Tabl. Encycl. 1: 183. 1791. Not *P. laxa* Haenke, 1791. Virginia.
Panicum divaricatum Michx., Fl. Bor. Amer. 1: 50. 1803. Not *P. divaricatum* L., 1753. Carolina. (Michaux's plant an old specimen with all but the lowest floret fallen from the spikelets.)
Poa subverticillata Pers., Syn. Pl. 1: 92. 1805. Based on *Poa laxa* Lam.
Panicum gracilentum Poir. in Lam., Encycl. Sup. 4: 276. 1816. Cultivated in Paris botanic garden.
Panicum debile Poir. in Lam., Encycl. Sup. 4: 283. 1816. Not *P. debile* Desf., 1798. Based on *P. divaricatum* Michx.
Panicum patentissimum Roem. and Schult., Syst. Veg. 2: 448. 1817. Not *P. patentissimum* Desv., 1816. Based on *P. divaricatum* Michx.
Schedonorus obtusus Bieler ex Roem. and Schult., Syst. Veg. 2: 710. 1817. Based on *Festuca obtusa* Bieler.
Poa festucoides LeConte ex Torr. in Eaton, Man. Bot. ed. 2. 367. 1818. New York, LeConte.
Poa brachiata Desv., Opusc. 100. 1831. Based on *Panicum divaricatum* Michx.
Festuca pseudoduriuscula Steud., Syn. Pl. Glum. 1: 312. 1854. Texas, Drummond 398.
Steinchisma divaricatum Raf. ex Jacks., Ind. Kew. 2: 982. 1895, as doubtful synonym of *Panicum debile*. Rafinesque (Bul. Bot. Seringe 1: 220. 1830) cites *Panicum divaricatum* [Michx.] under *Steinchisma*, but does not transfer the name.
Festuca nutans palustris Muhl. ex Piper, U. S. Natl. Herb. Contrib. 10: 34. 1906, as synonym of *F. obtusa* "Spreng."
Festuca obtusa var. *sprengeliana* St.-Yves, Candollea 2: 276. 1925. Based on *F. obtusa* Bieler.
- (29) *Festuca occidentalis* Hook., Fl. Bor. Amer. 2: 249. 1840. Mouth of Columbia River, Scouler, Douglas.
Festuca ovina var. *polyphylla* Vasey ex Beal, Grasses N. Amer. 2: 597. 1896. Cascade Mountains, Oreg., Howell.
- (1) *Festuca octoflora* Walt., Fl. Carol. 81. 1788. South Carolina.
Festuca setacea Poir. in Lam., Encycl. Sup. 2: 638. 1811. Grown in Jardin du Val de Grace, France, source unknown. [?Carolina, Bosc.]
Festuca parviflora Ell., Bot. S. C. and Ga. 1: 170. 1816. Orangeburg, S. C.
Diarrhena setacea Roem. and Schult., Syst. Veg. 1: 289. 1817. Based on *Festuca setacea* Poir.
Festuca octoflora var. *aristulata* Torr. ex L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 547. 1894. Texas, Nealley.
Vulpia octoflora Rydb., Torrey Bot. Club Bul. 36: 538. 1909. Based on *Festuca octoflora* Walt.
Gnomomia octoflora Lunell, Amer. Mid. Nat. 4: 224. 1915. Based on *Festuca octoflora* Walt.
- FESTUCA OCTOFLORA* var. *GLAUCA* (Nutt.) Fernald, Rhodora 34: 209. 1932. Based on *F. tenella* var. *glauca* Nutt.
Festuca tenella var. *glauca* Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 147. 1837. Fort Smith, Ark., Nuttall.
Vulpia octoflora var. *glauca* Fernald, Rhodora 47: 107. 1945. Based on *Festuca tenella* var. *glauca* Nutt.
- FESTUCA OCTOFLORA* var. *HIRTELLA* Piper, U. S. Natl. Herb. Contrib. 10: 12. 1906. Santa Catalina Mountains, Ariz., Shear 1962. (Published as *F. octoflora* subsp. *hirtella*.)
Festuca pusilla Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 98. 1862. California, Nuttall.
Vulpia octoflora var. *hirtella* Henr., Blumea 2: 320. 1937. Based on *Festuca octoflora* subsp. *hirtella* Piper.
- FESTUCA OCTOFLORA* var. *TENELLA* (Willd.) Fernald, Rhodora 34: 209. 1932. Based on *F. tenella* Willd.
Festuca tenella Willd., Sp. Pl. 1: 419. 1797. North America [Pennsylvania]. Name only, Muhl., Amer. Phil. Soc. Trans. 3: 161. 1793.
Schedonorus tenellus Beauv., Ess. Agrost. 99, 163, 177. 1812. Based on *Festuca tenella* Willd.
Brachypodium festucoides Link, Enum. Pl. 1: 95. 1821. Based on *Festuca tenella* L. (error for Willd.)
Vulpia tenella Heynh., Nom. 1: 854. 1840. Based on *Festuca tenella* Willd.
Festuca tenella var. *aristulata* Torr., U. S. Expl. Miss. Pacif. Rpt. 4: 156. 1856. Name only. Napa Valley, Calif., Bigelow.
Festuca gracilentia Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 97. 1862. Northern Texas, Buckley.

- Vulpia octoflora* var. *tenella* Fernald, *Rhodora* 47: 107. 1945. Based on *Festuca tenella* Willd.
- (30) *Festuca ovina* L., Sp. Pl. 73. 1753. Europe.
- Festuca ovina* var. *vivipara* L., Sp. Pl. ed. 2. 1: 108. 1762. Sweden.
- Bromus ovinus* Scop., Fl. Carn. 1: 77. 1772. Based on *Festuca ovina* L.
- Avena ovina* Salisb., Prodr. Stirp. 22. 1796. Based on *Festuca ovina* L.
- Festuca ovina* var. *duriuscula* A. Gray ex Port. and Coult., Syn. Fl. Colo. 150. 1874. Not *F. ovina* var. *duriuscula* Koch, 1837. Name only, for alpine specimens from Colorado [Hall and Harbour 665]. No reference to *F. duriuscula* L.
- Festuca amethystina* var. *asperima* Hack. ex Beal, Grasses N. Amer. 2: 601. 1896. Arizona, Rusby 901.
- Festuca minutiflora* Rydb., Torrey Bot. Club Bul. 32: 608. 1905. Cameron Pass, Colo., Baker.
- Festuca ovina calligera* Piper, U. S. Natl. Herb. Contrib. 10: 27. 1906. Based on *F. amethystina* var. *asperima* Hack.
- Festuca saximontana* Rydb., Torrey Bot. Club Bul. 36: 536. 1909. Banff, Alberta, MacCalla 2331.
- Festuca calligera* Rydb., Torrey Bot. Club Bul. 36: 537. 1909. Based on *F. ovina calligera* Piper.
- Gnomonia ovina* Lunell, Amer. Midl. Nat. 4: 224. 1915. Based on *Festuca ovina* L.
- Festuca ovina* subsp. *saximontana* St.-Yves, Candollea 2: 245. 1925. Based on *F. saximontana* Rydb.
- Festuca ovina* subsp. *saximontana* var. *rydbergii* St.-Yves, Candollea 2: 245. 1925. Based on *F. saximontana* Rydb.
- Festuca brevifolia* var. *utahensis* St.-Yves, Candollea 2: 257. 1925. Wasatch Mountains, Utah; Colorado, Baker 175.
- FESTUCA OVINA var. BRACHYPHYLLA (Schult.) Piper, U. S. Natl. Herb. Contrib. 10: 27. 1906. Based on *F. brachyphylla* Schult. (Published as *F. ovina brachyphylla*.)
- Festuca brevifolia* R. Br., Sup. App. Parry's Voy. 289. 1824. Not *F. brevifolia* Muhl., 1817. Melville Island, Arctic America.
- Festuca brachyphylla* Schult., Mantissa 3 (Add. 1): 646. 1827. Based on *F. brevifolia* R. Br.
- Festuca ovina* var. *brevifolia* S. Wats. in King, Geol. Expl. 40th Par. 5: 389. 1871. Based on *F. brevifolia* R. Br.
- Festuca ovina* subsp. *saximontana* var. *purpusiana* St.-Yves, Candollea 2: 247. 1925. Farewell Gap, Calif., Purpus 3076, 5117.
- FESTUCA OVINA var. DURIUSCULA (L.) Koch, Syn. Fl. Germ. Helv. 812. 1837. Based on *F. duriuscula* L.
- Festuca duriuscula* L., Sp. Pl. 74. 1753. Europe.
- FESTUCA OVINA var. GLAUCA (Lam.) Koch, Syn. Fl. Germ. Helv. 812. 1837. Based on *F. glauca* Lam.
- Festuca glauca* Lam., Encycl. 2: 459. 1788. France.
- The following varieties of *F. ovina*, recognized by Piper (North American Species of Festuca, U. S. Natl. Herb. Contrib. 10: 26-28. 1906), are based on European types. The specimens cited by him are in this Manual referred as follows:
- F. ovina sciaphila* (Schur) Aschers. and Graebn., to *F. ovina*.
- F. ovina supina* (Schur) Hack., to *F. ovina* var. *brachyphylla*.
- F. ovina pseudovina* Hack., to *F. ovina*.
- (6) *Festuca pacifica* Piper, U. S. Natl. Herb. Contrib. 10: 12. 1906. Pullman, Wash., Elmer 262.
- Vulpia pacifica* Rydb., Torrey Bot. Club Bul. 36: 538. 1909. Based on *Festuca pacifica* Piper.
- Festuca subbiflora* Suksdorf, Werdenda 1²: 2. 1923. Bingen, Wash., Suksdorf 6144.
- Festuca dives* Suksdorf, Werdenda 1²: 3. 1923. Not *F. dives* Muell., 1863. Bingen, Wash., Suksdorf 6153.
- FESTUCA PACIFICA var. SIMULANS Hoover, Madroño 3: 228. 1936. Kern County, Calif., Hoover 451.
- (21) *Festuca paradoxa* Desv., Opusc. 105. 1831. Habitat unknown [United States].
- Festuca nutans* Bieler, Pl. Nov. Herb. Spreng. Cent. 10. 1807. Not *F. nutans* Moench, 1794. Pennsylvania, Muhlenberg.
- Poa nutans* Link, Enum. Pl. 1: 86. 1821. Based on *Festuca nutans* Bieler.
- Festuca shortii* Kunth ex Wood, Class-book ed. 1861. 794. 1861; A. Gray, Man. ed. 6. 669. 1890.
- ?*Festuca nutans* var. *palustris* Wood, Amer. Bot. and Flor. pt. 2: 399. 1871. Eastern States.
- Festuca nutans* var. *major* Vasey, U. S. Dept. Agr. Spec. Rpt. 63: 43. 1883. Name only; Beal, Grasses N. Amer. 2: 589. 1896, as synonym of *F. nutans* var. *shortii* Beal.
- Festuca nutans* var. *shortii* Beal, Grasses N. Amer. 2: 589. 1896. Based on *F. shortii* Kunth.
- Gnomonia nutans* Lunell, Amer. Midl. Nat. 4: 224. 1915. Based on "*Festuca nutans* Willd."
- (10) *Festuca reflexa* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 98. 1862. California.
- Festuca microstachys* var. *pauciflora* Scribn. ex Beal, Grasses N. Amer. 2: 586. 1896. Oregon, Howell.
- Vulpia reflexa* Rydb., Torrey Bot. Club Bul. 36: 538. 1909. Based on *Festuca reflexa* Buckl.

Festuca rigescens (Presl) Kunth, Rév. Gram. 1: Sup. 31. 1830. Based on *Diplachne rigescens* Presl.

Diplachne rigescens Presl, Rel. Haenk. 1: 260. 1830. Peru, *Haenke*.

(28) **Festuca rubra** L., Sp. Pl. 74. 1753. Europe.

Festuca ovina var. *rubra* Smith, English Fl. 1: 139. 1824. Based on *F. rubra* L.

Festuca duriuscula var. *rubra* Wood, Amer. Bot. and Flor. pt. 2: 399. 1871. Presumably based on *F. rubra* L.

Festuca oregona Vasey, Bot. Gaz. 2: 126. 1877. Oregon.

Festuca ovina subsp. *rubra* Hook. f., Stud. Fl. ed. 3. 497. 1884. Based on *F. rubra* L.

Festuca rubra var. *littoralis* Vasey ex Beal, Grasses N. Amer. 2: 607. 1896. Tillamook Bay, Oreg., *Howell* in 1882.

Festuca vallicola Rydb., N. Y. Bot. Gard. Mem. 1: 57. 1900. Silver Bow, Mont., *Rydberg* 2108.

Festuca earlei Rydb., Torrey Bot. Club Bul. 32: 608. 1905. La Plata Canyon, Colo., *Baker*, *Earle*, and *Tracy* 920.

Festuca rubra prolifera Piper, U. S. Natl. Herb. Contrib. 10: 21. 1906. Mount Washington, N. H., *Pringle* in 1877.

Festuca rubra var. *densiuscula* Hack. ex Piper, U. S. Natl. Herb. Contrib. 10: 22. 1906. Crescent City, Calif., *Davy* and *Blasdale* 5931.

Festuca rubra var. *prolifera* Piper in Robinson, Rhodora 10: 65. 1908. Based on *F. rubra prolifera* Piper.

Festuca prolifera Fernald, Rhodora 35: 133. 1933. Based on *F. rubra prolifera* Piper.

Festuca rubra var. *mutica* Hartm. forma *prolifera* Hylander, Uppsala Univ. Årskr. 7: 83. 1945. Based on *F. rubra* var. *prolifera* Piper.

FESTUCA RUBRA var. **COMMUTATA** Gaud., Fl. Helv. 1: 287. 1828. Switzerland.

Festuca fallax Thuill., Fl. Env. Paris n. ed. 50. 1799. France.

Festuca rubra var. *fallax* Hack., Bot. Centralbl. 8: 407. 1881. Based on *F. fallax* Thuill.

Festuca rubra subsp. *eurubra* var. *commutata* subvar. *eu-commutata* St.-Yves, Ann. Cons. Jard. Genève 17: 129. 1913. Based on *F. commutata* Gaud.

FESTUCA RUBRA var. **HETEROPHYLLA** Mutel, Fl. Franç. 4: 103. 1837. Based on *F. heterophylla* Lam.

Festuca heterophylla Lam., Fl. Franç. 3: 600. 1778. France.

FESTUCA RUBRA var. **LANUGINOSA** Mert. and Koch, Deut. Fl. ed. 3. 1: 654. 1823. Prussia.

Festuca arenaria Osbeck in Retz., Sup. Prodr. Fl. Scand. 1: 4. 1805. Not *F. arenaria* Lam., 1791. Scandinavia.

Festuca rubra var. *arenaria* Fries, Fl. Halland. 28. 1818. Based on *F.*

arenaria Osbeck.

Bromus secundus Presl, Rel. Haenk. 1: 263. 1830. Nootka Sound, Vancouver Island, *Haenke*.

Festuca richardsoni Hook., Fl. Bor. Amer. 2: 250. 1840. Arctic seacoast of North America, *Richardson*.

Festuca rubra var. *villosa* Vasey ex Macoun, Can. Pl. Cat. 2^d: 236. 1888. Name only, for specimen collected by Macoun at Dawson, Yukon Territory.

Festuca rubra var. *pubescens* Vasey ex Beal, Grasses N. Amer. 2: 607. 1896. Not *F. rubra* var. *pubescens* Spenner, 1825. Oregon, *Howell*.

Festuca rubra secunda Scribn., Mo. Bot. Gard. Rpt. 10: 39. 1899. Based on *Bromus secundus* Presl.

Festuca rubra var. *subvillosa* forma *vivipara* Eames, Rhodora 11: 89. 1909. Newfoundland, Governors Island, *Eames* and *Godfrey*.

Festuca rubra subsp. *richardsoni* Hultén, Acta Univ. Lund. n. ser. 38: 246. map 178c. 1942. Based on *F. richardsoni* Hook.

The following varieties of *Festuca rubra*, recognized by Piper (North American Species of Festuca, U. S. Natl. Herb. Contrib. 10: 21-23. 1906), are based on European types. The specimens cited by him are in this Manual referred as follows:

F. rubra megastachya Gaud., to *F. rubra*.

F. rubra glaucoidea Piper (based on *F. glaucescens* Hegetschw.), to *F. rubra*.

F. rubra multiflora (Hoffm.) Aschers. and Graebn., to *F. rubra*.

F. rubra pruinosa Hack., to *F. rubra*.

F. rubra lanuginosa Mert. and Koch, to *F. rubra* var. *lanuginosa*.

F. rubra kitaibeliana (Schult.) Piper, to *F. rubra* var. *lanuginosa*.

(24) **Festuca scabrella** Torr. in Hook., Fl. Bor. Amer. 2: 252. 1840. Rocky Mountains, *Drummond*.

Melica hallii Vasey, Bot. Gaz. 6: 296. 1881. Rocky Mountains, latitude 39° to 41° [north half of Colorado], *Hall* and *Harbour* 621.

Festuca hallii Piper, U. S. Natl. Herb. Contrib. 10: 31. 1906. Based on *Melica hallii* Vasey.

Festuca confinis subsp. *rabiosa* Piper, U. S. Natl. Herb. Contrib. 10: 41. 1906. Crazy Womans Creek, Wyo., *Williams* and *Griffiths* 25.

Daluca hallii Lunell, Amer. Midl. Nat. 4: 221. 1915. Based on *Melica hallii* Vasey.

Festuca altaica subsp. *arizonica* subvar. *hallii* St.-Yves, Candollea 2: 271. 1925. Based on *Melica hallii* Vasey.

Festuca kingii var. *rabiosa* Hitchc., Amer. Jour. Bot. 21: 128. 1934. Based on *F. confinis* subsp. *rabiosa* Piper.

Hesperochloa kingii var. *rabiosa* Swallen, Biol. Soc. Wash. Proc. 54: 45. 1941.

- Based on *F. confinis* subsp. *rabiosa* Piper.
- FESTUCA SCABRELLA** var. **MAJOR** Vasey, U. S. Natl. Herb. Contrib. 1: 278. 1893. Spokane County, Wash., *Suksdorf* 118.
- Festuca campestris* Rydb., N. Y. Bot. Gard. Mem. 1: 57. 1900. Based on *F. scabrella* var. *major* Vasey.
- (2) **Festuca sciurea** Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 147. 1837. Arkansas, *Nuttall*.
- ?*Festuca quadriflora* Walt., Fl. Carol. 81. 1788. Not *F. quadriflora* Honck., 1782. South Carolina.
- Festuca monandra* Ell., Bot. S. C. and Ga. 1: 170. 1816, as synonym of *F. myuros* L., as misapplied by *Elliott*.
- Dasiola elliottea* Raf., Neogenyt. 4. 1825. Not *Festuca elliotii* Hack., 1906. Based on *Festuca monandra* Ell.
- Vulpia quadriflora* Trin. ex Steud., Nom. Bot. ed. 2. 2: 780. 1841. Based on *Festuca quadriflora* Walt.
- Vulpia sciurea* Henr., Blumea 2: 323. 1937. Presumably based on *Festuca sciurea* Nutt.
- Vulpia elliottea* Fernald, Rhodora 47: 106. 1945. Based on *Dasiola elliottea* Raf.
- (18) **Festuca sororia** Piper, U. S. Natl. Herb. Contrib., 16: 197. 1913. Rincon Mountains, Ariz., *Nealley* 177.
- Festuca subulata* var. *sororia* St.-Yves, Candollea 2: 285. 1925. Based on *F. sororia* Piper.
- (15) **Festuca subulata** Trin. in Bong., Acad. St. Pétersb. Mém. VI. Math. Phys. Nat. 2: 173. 1832. Sitka, Alaska, *Mertens*.
- Festuca jonesii* Vasey, U. S. Natl. Herb. Contrib. 1: 278. 1893. Utah, *Jones* in 1880.
- Festuca subulata* var. *jonesii* St.-Yves, Candollea 2: 284. 1925. Based on *F. jonesii* Vasey.
- (14) **Festuca subuliflora** Scribn. in Macoun, Can. Pl. Cat. 2⁵: 396. 1890. Goldstream, Vancouver Island, *Macoun* 7. (By a slip of the pen the name is given as "*subulifolia*" in a note following.)
- Festuca ambigua* Vasey, U. S. Natl. Herb. Contrib. 1: 277. 1893. Not *F. ambigua* Le Gal., 1852. Oregon, *Howell* 19 in 1881.
- Festuca denticulata* Beal, Grasses N. Amer. 2: 589. 1896. Based on *F. ambigua* Vasey.
- (22) **Festuca thurberi** Vasey in Rothr., Cat. Pl. Survey W. 100th Merid. 56. 1874. South Park, Colo., *Wolf* 1154.
- Poa festucoides* Jones, Calif. Acad. Sci. Proc. II. 5: 723. 1895. Not *P. festucoides* Lam., 1791. Mount Ellen, Henry Mountains, Utah, *Jones* 5671.
- Poa kaibensis* Jones, Erythea 4: 36. 1896. Based on *P. festucoides* Jones.
- Festuca tolucensis* subsp. *thurberi* St.-Yves, Candollea 2: 304. 1925. Based on *F. thurberi* Vasey.
- (13) **Festuca tracyi** Hitchc. in Abrams, Illustr. Fl. 1: 220. 1923. Howell Mountain, Napa County, Calif., *J. P. Tracy* 1479.
- Festuca valesiaca** Schleich. ex Gaud., Agrost. Helv. 1: 242. 1811. Switzerland.
- Festuca ovina* var. *valesiaca* Link, Hort. Berol. 2: 267. 1833. Based on "*F. valesiaca* Gaud." the name spelled "*vallesiaca*."
- (19) **Festuca versuta** Beal, Grasses N. Amer. 2: 589. 1896. Based on *F. texana* Vasey.
- Festuca texana* Vasey, Torrey Bot. Club Bul. 13: 119. 1886. Not *F. texana* Steud., 1854. Upper Llano, Tex., *Reverchon* 1618.
- Festuca nutans* var. *johnsoni* Vasey, U. S. Natl. Herb. Contrib. 2: 548. 1894. Harrison City, Tex., *Johnson*.
- Festuca johnsoni* Piper, U. S. Natl. Herb. Contrib. 10: 35. 1906. Based on *F. nutans* var. *johnsoni* Vasey.
- Festuca obtusa* subsp. *versuta* St.-Yves, Candollea 2: 280. 1925. Based on *F. versuta* Beal.
- (27) **Festuca viridula** Vasey, U. S. Dept. Agr., Div. Bot. Bul. 13²: pl. 93. 1893. California (probably Summit Station), *Bolander*.
- Festuca howellii* Hack. ex Beal, Grasses N. Amer. 2: 591. 1896. Oregon, *Howell* [248].
- Gnomonia viridula* Lunell, Amer. Midl. Nat. 4: 224. 1915. Based on *Festuca viridula* Vasey.
- Festuca viridula* var. *vaseyana* St.-Yves, Candollea 2: 265. 1925. Based on *F. viridula* Vasey.
- Festuca viridula* var. *howellii* St.-Yves, Candollea 2: 266. 1925. Based on *F. howellii* Hack.

(80) GASTRIDIDIUM Beauv.

- (1) **Gastridium ventricosum** (Gouan) Schinz and Thell., Vierteljahrs. Nat. Ges. Zürich 58: 39. 1913. Based on *Agrostis ventricosa* Gouan.
- Agrostis ventricosa* Gouan, Hort. Monsp. 39. pl. 1. f. 2. 1762. France.
- Milium lendigerum* L., Sp. Pl. ed. 2. 91. 1762. Europe.
- Agrostis australis* L., Mant. Pl. 1: 30. 1767. Portugal.
- Alopecurus ventricosus* Huds., Fl. Angl. ed. 2. 1: 28. 1778. Based on *Agrostis ventricosa* Gouan.
- Agrostis lendigera* Neck., Elem. Bot. 3: 219. 1791. Based on *Milium lendigerum* L.
- Avena lendigera* Salisb., Prodr. Stirp. 23. 1796. Based on *Milium lendigerum* L.
- Gastridium australe* Beauv., Ess. Agrost. 21, 164. pl. 6. f. 6. 1812. Europe.

Gastridium lendigerum Desv., Obs. Angers 48. 1818. Based on *Milium lendigerum* L.

Chilochloa ventricosa Beauv. ex Steud., Nom. Bot. ed. 2. 1: 350. 1840, as synonym of *Alopecurus ventricosus* Huds.

Lachnagrostis phleoides Nees and Meyen in Nees, Nov. Act. Acad. Caes. Leop. Carol. 19: Sup. 1: 14. 1841; 146, 1843. Valparaiso, Chile.

(7) GLYCERIA R. Br.

- (1) ***Glyceria acutiflora*** Torr., Fl. North. and Mid. U. S. 1: 104. 1823. New York, New Jersey, and Massachusetts. *Festuca brevifolia* Muhl. erroneously cited as synonym.

Festuca acutiflora Bigel., Fl. Bost. ed. 3. 39. 1840. Based on *Glyceria acutiflora* Torr.

Panicularia acutiflora Kuntze, Rev. Gen. Pl. 2: 783. 1891. Based on *Glyceria acutiflora* Torr.

- (4) ***Glyceria arkansana*** Fernald, Rhodora 31: 49. 1929. Varner, Ark., *Bush* 9 in 1898.

- (2) ***Glyceria borealis*** (Nash) Batchelder, Manchester Inst. Proc. 1: 74. 1900. Based on *Panicularia borealis* Nash.

Glyceria fluitans var. *angustata* Vasey ex Fernald, Portland Soc. Nat. Hist. Proc. 2: 91. 1895. Maine, Fernald [193].

Panicularia borealis Nash, Torrey Bot. Club Bul. 24: 348. 1897. Maine, Fernald.

- (13) ***Glyceria canadensis*** (Michx.) Trin., Acad. St. Pétersb. Mém. VI. Math. Phys. Nat. 1: 366. 1830. Based on *Briza canadensis* Michx.

Briza canadensis Michx., Fl. Bor. Amer. 1: 71. 1803. Canada, Michaux.

Megastachya canadensis Michx. ex Roem. and Schult., Syst. Veg. 2: 593. 1817. Based on *Briza canadensis* Michx.

?*Briza canadensis* Nutt., Gen. Pl. 1: erratum. 1818. Not op. cit. 69. New Jersey, near Philadelphia.

Nevroloma canadensis Raf., Jour. Phys. Chym. 89: 106. 1819. Based on *Briza canadensis* Michx.

Poa canadensis Torr., Fl. North. and Mid. U. S. 1: 112. 1823. Based on *Briza canadensis* Michx.

Panicularia canadensis Kuntze, Rev. Gen. Pl. 2: 783. 1891. Based on *Briza canadensis* Michx.

GLYCERIA CANADENSIS var. **LAXA** (Scribn.) Hitchc., Amer. Jour. Bot. 21: 128. 1934. Based on *Panicularia laxa* Scribn.

Panicularia laxa Scribn., Torrey Bot. Club Bul. 21: 37. 1894. Mount Desert, Maine, Redfield and Rand.

Glyceria laxa Scribn. in Rand and Redfield, Fl. Mt. Desert 180. 1894. Based on *Panicularia laxa* Scribn.

Glyceria canadensis var. *parviflora* Fernald, Portland Soc. Nat. Hist. Proc. 2: 91. 1895, as synonym of *G. laxa* Scribn.

- (8) ***Glyceria declinata*** Brébiss. Fl. Normandie 354. 1859. Orne River, France.

Glyceria plicata var. *declinata* Druce, List Brit. Pl. 83. 1908. Presumably based on *G. declinata* Brébiss.

Glyceria cookei Swallen, Wash. Acad. Sci. Jour. 31: 348. f. 1. 1941. Mount Shasta City, Calif., Cooke 15312.

- (15) ***Glyceria elata*** (Nash) Hitchc. in Jepson, Fl. Calif. 1: 162. 1912. Based on *Panicularia elata* Nash.

Panicularia elata Nash in Rydb., N. Y. Bot. Gard. Mem. 1: 54. 1900. Montana, Flodman 176.

Glyceria latifolia Cotton, Torrey Bot. Club Bul. 29: 573. 1902. Washington, Elmer 721.

Panicularia nervata elata Piper, U. S. Natl. Herb. Contrib. 11: 140. 1906. Based on *P. elata* Nash.

- (16) ***Glyceria erecta*** Hitchc. in Jepson, Fl. Calif. 1: 161. 1912. Yosemite, Calif., Hitchcock 3250½.

Panicularia erecta Hitchc., Amer. Jour. Bot. 2: 309. 1915. Based on *Glyceria erecta* Hitchc.

Glyceria californica Beetle, Madroño 8: 161. 1946. Farwell, Tulare County, Calif., Purpus 2057.

Torreyochloa erecta Church, Amer. Jour. Bot. 36: 163. 1949. Based on *Glyceria erecta* Hitchc.

Torreyochloa californica Church, Amer. Jour. Bot. 36: 163. 1949. Based on *Glyceria californica* Beetle.

- (20) ***Glyceria fernaldii*** (Hitchc.) St. John, Rhodora 19: 76. 1917. Based on *Glyceria pallida* var. *fernaldii* Hitchc.

Glyceria pallida var. *fernaldii* Hitchc., Rhodora 8: 211. 1906. Maine, Fernald 191.

Panicularia fernaldii Hitchc. in House, N. Y. State Mus. Bul. 233-234: 11. 1921. Based on *Glyceria pallida* var. *fernaldii* Hitchc.

Torreyochloa fernaldii Church, Amer. Jour. Bot. 36: 164. 1949. Based on *Glyceria pallida* var. *fernaldii* Hitchc.

- (6) ***Glyceria fluitans*** (L.) R. Br., Prodr. Fl. Nov. Holl. 1: 179. 1810. Based on *Festuca fluitans* L.

Festuca fluitans L., Sp. Pl. 75. 1753. Europe.

Poa fluitans Scop., Fl. Carn. ed. 2. 73. 1772. Based on "Gramen aquaticum fluitans" Bauhin, cited by Linnaeus sub *Festuca fluitans*.

Hydrochloa fluitans Hartm., Gen. Gram. Scand. 8. 1819. Presumably based on *Festuca fluitans* L.

Melica fluitans Raspail, Ann. Sci. Nat., Bot. 5: 443. 1825. Based on *Festuca fluitans* L.

- Devauxia fluitans* Beauv. ex Kunth, Enum. Pl. 1: 367. 1833, as synonym of *Glyceria fluitans* R. Br.
- Panicularia fluitans* Kuntze, Rev. Gen. Pl. 2: 782. 1891. Based on *Festuca fluitans* L.
- Panicularia brachyphylla* Nash, Torrey Bot. Club Bul. 24: 349. 1897. Near New York City, Nash.
- (9) *Glyceria grandis* S. Wats. ex A. Gray, Man. ed. 6. 667. 1890. [Type from Quebec, Munro in 1858.] New England to western New York, Michigan, Minnesota, and westward.
- Poa aquatica* var. *americana* Torr., Fl. North. and Mid. U. S. 1: 108. 1823. Massachusetts, Cooley.
- Panicularia americana* MacM., Met. Minn. Vall. 81. 1892. Based on *Poa aquatica* var. *americana* Torr.
- Glyceria americana* Pammel, Iowa Geol. Survey Sup. Rpt. 1903: 271. 1905. Based on *Poa aquatica* var. *americana* Torr.
- Glyceria flavescens* Jones, Mont. Univ. Bul. Biol. Ser. 15: 17. pl. 2. 1910. Swan Lake, Mont., Jones [9697].
- Panicularia grandis* Nash in Britt. and Brown, Illus. Fl. ed. 2. 1: 265. 1913. Based on *Glyceria grandis* S. Wats.
- Glyceria grandis* forma *pallescentes* Fernald, Rhodora 23: 231. 1921. Nova Scotia, Bissell, Pease, Long, and Linder 20,026.
- Glyceria maxima* subsp. *grandis* Hultén, Acta Univ. (n.s.) 38: 229. 1942. Based on *G. grandis* S. Wats.
- (3) *Glyceria leptostachya* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 95. 1862. Oregon, Nuttall.
- Panicularia davyi* Merr., Rhodora 4: 145. 1902. Sonoma County, Calif., Davy 6005.
- Panicularia leptostachya* Piper in Piper and Beattie, Fl. Northw. Coast 59. 1915. Not *P. leptostachya* Maclosk., 1904. Based on *Glyceria leptostachya* Buckl.
- (12) *Glyceria melicaria* (Michx.) Hubb., Rhodora 14: 186. 1912. Based on *Panicum melicarium* Michx.
- Panicum melicarium* Michx., Fl. Bor. Amer. 1: 50. 1803. Carolina, Michaux. [Michaux's specimen overmature, all the florets but the lowermost fallen.]
- Poa torreyana* Spreng., Neu. Entd. 2: 104. 1821. Massachusetts.
- Poa elongata* Torr. ex Spreng., Neu. Entd. 2: 104. 1821. Not *P. elongata* Willd., 1809. As synonym of *P. torreyana* Spreng.
- Poa elongata* Torr., Fl. North. and Mid. U. S. 1: 112. 1823. Not *P. elongata* Willd., 1809. Massachusetts, Cooley.
- Glyceria elongata* Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 2¹: 58. 1836. Based on *Poa elongata* Torr.
- Panicularia elongata* Kuntze, Rev. Gen. Pl. 2: 783. 1891. Based on *Poa elongata* Torr.
- Panicularia torreyana* Merr., Rhodora 4: 146. 1902. Based on *Poa torreyana* Spreng.
- Glyceria torreyana* Hitchc., Rhodora 8: 211. 1906. Based on *Poa torreyana* Spreng.
- Panicularia melicaria* Hitchc., U. S. Natl. Herb. Contrib. 12: 149. 1908. Based on *Panicum melicarium* Michx.
- (10) *Glyceria nubigena* W. A. Anders., Rhodora 35: 321. f. B. 1933. Clingmans Dome, Great Smoky Mountains, Tenn., Anderson and Jennison 1418.
- (11) *Glyceria obtusa* (Muhl.) Trin., Acad. St. Pétersb. Mém. VI. Math. Phys. Nat. 1: 366. 1830. Based on *Poa obtusa* Muhl.
- Poa obtusa* Muhl., Descr. Gram. 147. 1817. Pennsylvania, Muhlenberg. Name only, Muhl., Cat. Pl. 11. 1813.
- Panicularia obtusa* Kuntze, Rev. Gen. Pl. 2: 783. 1891. Based on *Poa obtusa* Muhl.
- (7) *Glyceria occidentalis* (Piper) J. C. Nels., Torreyia 19: 224. 1919. Based on *Panicularia occidentalis* Piper.
- Panicularia occidentalis* Piper in Piper and Beattie, Fl. Northw. Coast 59. 1915. Vancouver, Wash., Piper 4905.
- (18) *Glyceria otisii* Hitchc., Amer. Jour. Bot. 21: 128. 1934. Jefferson County, Wash., Otis 1548.
- Torreyochloa otisii* Church, Amer. Jour. Bot. 36: 163. 1949. Based on *Glyceria otisii* Hitchc.
- (19) *Glyceria pallida* (Torr.) Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 2¹: 57. 1836. Based on *Windsoria pallida* Torr.
- Windsoria pallida* Torr., Cat. Pl. N. Y. 91. 1819. New York.
- Triodia pallida* Spreng., Neu. Entd. 1: 246. 1820. New York, "Windsoria pallida Eddy in litt"; Spreng., Syst. Veg. 1: 330. 1825. Based on *Windsoria pallida* Torr.
- Poa dentata* Torr., Fl. North. and Mid. U. S. 1: 107. 1823. Based on *Windsoria pallida* Torr.
- Uralespis pallida* Kunth, Rév. Gram. 1: 108. 1829. Based on *Windsoria pallida* Torr.
- Panicularia pallida* Kuntze, Rev. Gen. Pl. 2: 783. 1891. Based on *Windsoria pallida* Torr.
- Panicularia pallida* var. *flava* Farwell, Mich. Acad. Sci. Rpt. 6: 203. 1904. "Glyceria flava Scribn." ined. Keweenaw County, Mich.
- Glyceria flava* Scribn. ex Farwell, Mich. Acad. Sci. Rpt. 6: 203. 1904, as synonym of *Panicularia pallida* var. *flava* Farwell.
- Torreyochloa pallida* Church, Amer. Jour. Bot. 36: 164. 1949. Based on *Windsoria pallida* Torr.

- (17) *Glyceria pauciflora* Presl, Rel. Haenk. 1: 257. 1830. Nootka Sound, Vancouver Island, *Haenke*.
Glyceria microtheca Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 96. 1862. Oregon, *Nuttall*.
Glyceria spectabilis var. *flaccida* Trin. ex A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 336. 1863, as synonym of *G. microtheca* Buckl., *G. leptostachya* Buckl. confused with it.
Panicularia pauciflora Kuntze, Rev. Gen. Pl. 2: 783. 1891. Based on *Glyceria pauciflora* Presl.
Panicularia holmii Beal, Torreyia 1: 43. 1901. Longs Peak, Colo., *Holm* 249.
Panicularia multifolia Elmer, Bot. Gaz. 36: 54. 1903. Olympic Mountains, Wash., *Elmer* 1939.
Panicularia flaccida Elmer, Bot. Gaz. 36: 55. 1903. Olympic Mountains, Wash., *Elmer* 1940.
Torreyochloa pauciflora Church, Amer. Jour. Bot. 36: 163. 1936. Based on *Glyceria pauciflora* Presl.
- (5) *Glyceria septentrionalis* Hitchc., Rhodora 8: 211. 1906. New Jersey, *Van Sickle*.
Panicularia septentrionalis Bicknell, Torrey Bot. Club Bul. 35: 196. 1908. Based on *Glyceria septentrionalis* Hitchc.
Panicularia fluitans var. *septentrionalis* Farwell, Mich. Acad. Sci. Rpt. 21: 353. 1920. Based on *Glyceria septentrionalis* Hitchc.
- (14) *Glyceria striata* (Lam.) Hitchc., Biol. Soc. Wash. Proc. 41: 157. 1928. Based on *Poa striata* Lam.
Poa striata Lam., Tabl. Encycl. 1: 183. 1791. Virginia; Carolina.
Poa nervata Willd., Sp. Pl. 1: 389. 1797. North America.
Poa striata Michx., Fl. Bor. Amer. 1: 69. 1803. Pennsylvania, *Michaux*.
Poa lineata Pers., Syn. Pl. 1: 89. 1805. Based on *P. striata* Michx.
Poa parviflora Pursh, Fl. Amer. Sept. 1: 80. 1814. Not *P. parviflora* R. Br., 1810. New York to Virginia.
Poa sulcata Roem. and Schult., Syst. Veg. 2: 550. 1817. Not *P. sulcata* Lag., 1816. Based on *P. striata* Lam.
Briza canadensis Nutt., Gen. Pl. 1: 69. 1818. Not *B. canadensis* Michx., 1803. Canada and Pennsylvania. (Canada refers to Michaux's species, Nuttall misunderstanding it.)
Glyceria michauxii Kunth, Rév. Gram. 1: 118. 1829. Based on *Poa striata* Michx.
Glyceria nervata Trin., Acad. St. Pétersb. Mém. VI. Math. Phys. Nat. 1: 365. 1830. Based on *Poa nervata* Willd.
Poa lamarckii Kunth, Enum. Pl. 1: 362. 1833. Based on *P. striata* Lam.
Glyceria neogaea Steud., Syn. Pl. Glum. 1: 285. 1854. Newfoundland.
Panicularia nervata Kuntze, Rev. Gen. Pl. 2: 783. 1891. Based on *Poa nervata* Willd.
Panicularia nervata forma *major* Millsp., Fl. W. Va. 473. 1892. Monongalia, W. Va.
Panicularia nervata stricta Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 13: 44. 1898. Colorado-Wyoming State line, A. Nelson 3818.
Panicularia nervata rigida Nash in Rydb., N. Y. Bot. Gard. Mem. 1: 54. 1900. Montana, Rydberg 2068.
Panicularia nervata var. *parviglumis* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 30: 8. 1901. Racine, Wis. *Wadmond* 36.
Glyceria nervata var. *stricta* Scribn. ex Hitchc. in A. Gray, Man. ed. 7. 159. 1908. Based on *Panicularia nervata stricta* Scribn.
Glyceria nervata var. *rigida* Lunell, Amer. Midl. Nat. 4: 223. 1915. Based on *Panicularia nervata rigida* Nash.
Panicularia rigida Rydb., Fl. Rocky Mount. 83. 1917. Based on *P. nervata rigida* Nash.
Panicularia nervata var. *filiformis* Farwell, Mich. Acad. Sci. Rpt. 20: 168. 1919. Michigan, *Farwell* 4514½.
Panicularia nervata var. *purpurascens* Farwell, Mich. Acad. Sci. Rpt. 20: 168. 1919. Michigan, *Farwell* 4495½ (first of several specimens cited).
Panicularia nervata var. *viridis* Farwell, Mich. Acad. Sci. Rpt. 22: 180. 1921. Michigan, *Farwell* 5234.
Glyceria striata var. *stricta* Fernald, Rhodora 31: 47. 1929. Based on *Panicularia nervata stricta* Scribn.
Glyceria rigida Rydb., Fl. Prairies and Plains Cent. N. Amer. 122. 1932. Not *G. rigida* Smith, 1824. Based on *Panicularia nervata rigida* Nash.
Panicularia strata Hitchc. in Small, Man. Southeast. Fl. 132. 1933. Based on *Poa striata* Lam.

(109) GYMNOPOGON Beauv.

- (1) *Gymnopogon ambiguus* (Michx.) B. S. P., Prel. Cat. N. Y. 69. 1888. Presumably based on *Andropogon ambiguus* Michx.
Andropogon ambiguus Michx., Fl. Bor. Amer. 1: 58. 1803. Carolina, *Michaux*.
Gymnopogon racemosus Beauv., Ess. Agrost. 41, 164. pl. 9. f. 3. 1812. Based on *Andropogon ambiguus* Michx.
Andropogon ambiguus sive *latifolius* Muhl. Cat. Pl. 94. 1813. Suggested change of name.
Anthopogon lepturoides Nutt., Gen. Pl. 82. 1818. Banks of the Potomac, near Harpers Ferry, Va.
Gymnopogon scoparius Trin., Gram. Unifl. 237. 1824. New Jersey.
Alloiatheros lepturoides Steud., Nom. Bot.

- ed. 2. 1: 55. 1840, as synonym of *Gymnopogon racemosus* Beauv.
Stipa expansa Willd. ex Steud., Nom. Bot. ed. 2. 2: 643. 1841, as synonym of *Gymnopogon racemosus* Beauv.
Gymnopogon distichophyllus Steud., Syn. Pl. Glum. 1: 218. 1854. Texas, Seubert Herb. [coll. Vinzent] 128; Louisiana, Hartmann 57.
Sciadonardus distichophyllus Steud., Flora 33: 229. 1850; Syn. Pl. Glum. 1: 218. 1854, as synonym of *Gymnopogon distichophyllus*. Louisiana, Hartmann 57.
Agrostis boeckeleri Seubert ex Steud., Syn. Pl. Glum. 1: 218. 1854, as synonym of *Gymnopogon distichophyllus*. Texas [Vinzent 128].
Alloiatheros ambiguus Ell. ex Jacks., Ind. Kew. 1: 83. 1893, as synonym of *Gymnopogon racemosus*.
Alloiatheros aristatus Raf. ex Jacks., Ind. Kew. 1: 83. 1893, as synonym of *Gymnopogon racemosus*.
(2) *Gymnopogon brevifolius* Trin., Gram. Unifl. 238. 1824. Delaware.
Anthopogon brevifolius Nutt. ex. Trin., Gram. Unifl. 238. 1824, as synonym of *Gymnopogon brevifolius* Trin.
Anthopogon filiforme Nutt., Amer. Phil. Soc. Trans. (n. s.) 5: 152. 1837. Banks of the Arkansas and in Delaware.
(3) *Gymnopogon chapmanianus* Hitchc., Amer. Jour. Bot. 2: 306. 1915. Sanford, Fla., Chase 4135.
(4) *Gymnopogon floridanus* Swallen, N. Amer. Fl. 17: 607. 1939. Clay County, Fla., Swallen 5596.

GYNERIUM Willd. ex Beauv.

- Gynerium sagittatum* (Aubl.) Beauv., Ess. Agrost. 138, 153. 1812. Based on *Saccharum sagittatum* Aubl.
Saccharum sagittatum Aubl., Pl. Guian. 1: 50. 1775. French Guiana.
Arundo sagittata Pers., Syn. Pl. 1: 102. 1805. Based on *Saccharum sagittatum* Aubl.
Gynerium procerum Beauv., Ess. Agrost. Atlas, pl. 24. f. 6. 1812. Based on *Saccharum sagittatum* Aubl.
Arundo sagittata Aubl. ex Beauv., Ess. Agrost. 153. 1812. Error for *Saccharum sagittatum* Aubl.
Gynerium saccharoides Humb. and Bonpl., Pl. Aequin. 2: 105. pl. 115. 1813. Venezuela, Humboldt and Bonpland.
Arundo saccharoides Poir. in Lam., Encycl. Sup. 4: 703. 1816. Based on *Gynerium saccharoides* Humb. and Bonpl.

(164) HACHELOCHLOA Kuntze

- (1) *Hachelechloa granularis* (L.) Kuntze, Rev. Gen. Pl. 2: 776. 1891. Based on *Cenchrus granularis* L.
Cenchrus granularis L., Mant. Pl. 2: 575. 1771. East Indies.

Manisuris granularis Swartz, Prodr. Veg. Ind. Occ. 25. 1788. Based on *Cenchrus granularis* L. The name was earlier given (L. f. Nov. Gram. Gen. 40. pl. 1. f. 4-7. 1779) without description or basis. *Manisuris*, based on this species, has been credited to Swartz (not *Manisuris* L.), but Swartz does not propose the genus as new. He includes the original *M. myuros* L. and adds *M. granularis*.

Manisuris polystachya Beauv., Fl. Oware et Benin 1: 24. pl. 14. 1804. Oware and Benin, West Africa.

Tripsacum granulare Raspail, Ann. Sci. Nat., Bot. 5: 306. 1825. Based on *Manisuris granularis* Swartz.

Rytillix glandulosa Raf., Bul. Bot. Seringe 1: 219. 1830. Change of name or slip of the pen for "granularis," "*Manisuris granularis*" being cited.

Rytillix granularis Skeels, U. S. Dept. Agr., Bur. Plant Indus. Bul. 282: 20. 1913. Based on *Cenchrus granularis* L.

(86) HELEOCHLOA Host ex Roemer

Heleochloa alopecuroides (Pill. and Mitterp.) Host, Icon. Gram. Austr. 1: 23. pl. 29. 1801; ex Roemer, Collect. Rem. Bot. 233. 1809. Based on *Phleum alopecuroides* Pill. and Mitterp.
Phleum alopecuroides Pill. and Mitterp., Iter Posegan. 147. pl. 16. 1783. Europe.

Crypsis alopecuroides Schrad., Fl. Germ. 1: 167. 1806. Based on *Heleochloa alopecuroides* Host.

- (1) *Heleochloa schoenoides* (L.) Host, Icon. Gram. Austr. 1: 23. pl. 30. 1801; ex Roemer, Collect. Rem. Bot. 233. 1809. Based on *Phleum schoenoides* L.
Phleum schoenoides L., Sp. Pl. 60. 1753. Southern Europe.

Crypsis schoenoides Lam., Tabl. Encycl. 1: 166. pl. 42. 1791. Based on *Phleum schoenoides* L. This name is spelled *C. schenoides* by Beauv., Ess. Agrost. 23. 1812.

(62) HELICTOTRICHON Besser

- (2) *Helictotrichon hookeri* (Scribn.) Henr., Blumea 3: 429. 1940. Based on *Avena hookeri* Scribn.

Avena pratensis var. *americana* Scribn., Bot. Gaz. 11: 177. 1886. Based on *A. versicolor* as described by Hooker (Fl. Bor. Amer. 2: 244. 1840), not *A. versicolor* Vill., 1779. Rocky Mountains, Drummond [209].

Avena hookeri Scribn. in Hack., True Grasses 123. 1890. Based on *A. versicolor* as described by Hooker.

Avena americana Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 7: 183. f. 165. 1897. Based on *A. pratensis* var. *americana* Scribn.

- (3) **Helictotrichon mortonianum** (Scribn.)
Henr., *Blumea* 3: 429. 1940. Based on
Avena mortoniana Scribn.

Avena mortoniana Scribn., *Bot. Gaz.* 21:
133. pl. 11. 1896. Silver Plume, Colo.,
Shear 697 [type]; *Rydberg* 2439.

- (1) **Helictotrichon pubescens** (Huds.) Pil-
ger, *Repert. Sp. Nov. Fedde* 45: 6.
1938. Based on *Avena pubescens* Huds.
Avena pubescens Huds., *Fl. Angl.* 42.
1762. England.

Heuffelia pubescens Schur, *Enum. Pl.*
Transsilv. 760. 1866. Based on *Avena*
pubescens L. (error for Huds.).

Avenula pubescens Dum., *Soc. Bot. Belg.*
Bul. 7¹: 68. 1868. Based on *Avena*
pubescens Huds.

Avenastrum pubescens Jess. ex Dalla
Torre, *Alpenfl.* 44. 1899. Based on
Avena pubescens Huds.

(11) HESPEROCHLOA (Piper) Rydb.

- (1) **Hesperochloa kingii** (S. Wats.) Rydb.,
Torrey Bot. Club Bul. 39: 106. 1912.
Based on *Poa kingii* S. Wats.

Poa kingii S. Wats. in King, *Geol. Expl.*
40th Par. 5: 387. 1871. East Hum-
boldt Mountains, *Watson* 1317.

Festuca confinis Vasey, *Torrey Bot. Club*
Bul. 11: 126. 1884. Pen Gulch, Colo.,
Vasey.

Festuca kingii Cassidy, *Colo. Agr. Expt.*
Sta. Bul. 12: 36. 1890. On the North
Poudre, Colo. It may be based on *Poa*
kingii S. Wats., though that is not cited;
there is a description. Proposed as new
by Scribner, U. S. Dept. Agr., Div.
Agrost. *Bul.* 5: 36. 1897. Based on *Poa*
kingii S. Wats.

Festuca watsoni Nash in Britt., *Man.* 148.
1901. Based on *Festuca kingii* Scribn.

Wasatchia kingii Jones, *West. Bot.*
Contrib. 14:16. 1912. Based on *Poa*
kingii S. Wats.

(159) HETEROPOGON Pers.

- (1) **Heteropogon contortus** (L.) Beauv. ex
Roem. and Schult., *Syst. Veg.* 2: 836.
1817. Based on *Andropogon contortus* L.
Andropogon contortus L., *Sp. Pl.* 1045.
1753. India.

Heteropogon glaber Pers., *Syn. Pl.* 2: 533.
1807. Europe.

Heteropogon hirtus Pers., *Syn. Pl.* 2: 533.
1807. Based on *Andropogon contortus* L.

Andropogon glaber Raspail, *Ann. Sci.*
Nat., Bot. 5: 307. 1825. Not *A. glaber*
Roxb., 1820. Based on *Heteropogon*
glaber Pers.

Andropogon secundus Willd. ex Nees,
Agrost. Bras. 364. 1829, as synonym
of *Heteropogon contortus*. Described in
Griseb., *Fl. Brit. W. Ind.* 558. 1864.
Not *A. secundus* Ell., 1821. Antigua,
Wulfschlaegel.

Heteropogon firmus Presl, *Rel. Haenk.* 1:

334. 1830. Mexico, *Haenke*.

Andropogon firmus Kunth, *Rév. Gram.* 1:
Sup. 39. 1830. Based on *Heteropogon*
firmus Presl.

Heteropogon contortus var. *hirtus* Fenzl ex
Hack. in Mart., *Fl. Bras.* 2³: 267. 1883.
Based on *H. hirtus* Pers.

Heteropogon contortus var. *glaber* Hack. in
Mart., *Fl. Bras.* 2³: 268. 1883. Based
on *H. glaber* Pers.

Andropogon contortus subvar. *secundus*
Hack. in DC., *Monogr. Phan.* 6: 587.
1889. Based on *A. secundus* Willd.

Andropogon contortus subvar. *glaber* Hack.
in DC., *Monogr. Phan.* 6: 587. 1889.
Based on *Heteropogon glaber* Pers.

Sorghum contortum Kuntze, *Rev. Gen. Pl.*
2: 791. 1891. Based on *Andropogon*
contortus L.

Holcus contortus Kuntze ex Stuck., *An.*
Mus. Nac. Buenos Aires 11: 48. 1904.
Based on *Andropogon contortus* L.

Heteropogon contortus subvar. *secundus*
Domin, *Bibl. Bot.* 85: 276. 1915. Based
on *Andropogon contortus* var. *secundus*
Hack.

- (2) **Heteropogon melanocarpus** (Ell.)
Benth., *Linn. Soc. Jour. Bot.* 19: 71.
1881. Based on *Andropogon melano-*
carpus Ell.

Andropogon melanocarpus Ell., *Bot. S. C.*
and Ga. 1: 146. 1816. Between Alta-
maha and Jefferson, Ga.

Stipa melanocarpa Muhl., *Descr. Gram.*
183. 1817. Georgia. Name only, Muhl.
Cat. Pl. 13. 1813.

Cymbopogon melanocarpus Spreng., *Syst.*
Veg. 1: 289. 1825. Based on *Andro-*
pogon melanocarpus Ell.

Trachypogon scrobiculatus Nees, *Agrost.*
Bras. 347. 1829. Piauhay, Brazil,
[Martius].

Andropogon scrobiculatus Kunth, *Rév.*
Gram. 1: Sup. 40. 1830. Based on
Trachypogon scrobiculatus Nees.

Heteropogon acuminatus Trin., *Acad. St.*
Pétersb. Mém. VI. Math. Phys. Nat. 2:
254. 1832. Brazil.

Heteropogon scrobiculatus Fourn., *Mex.*
Pl. 2: 64. 1886. Based on *Trachypogon*
scrobiculatus Nees.

Sorghum melanocarpum Kuntze, *Rev.*
Gen. Pl. 2: 792. 1891. Based on *Andro-*
pogon melanocarpus Ell.

Heteropogon melanocarpus Coult., U. S.
Natl. Herb. Contrib. 2: 493. 1894.
Based on *Stipa melanocarpa* Muhl.

Spirotheros melanocarpus Raf. ex Jacks.,
Ind. Kew. 2: 967. 1895, as synonym of
Heteropogon acuminatus Trin.

(116) HIEROCHLOË R. Br.

- (1) **Hierochloë alpina** (Swartz) Roem. and
Schult., *Syst. Veg.* 2: 515. 1817. Based
on *Holcus alpinus* Swartz.
Aira alpina Liljeb., *Utk. Svensk Fl.* 49.

1792. Not *A. alpina* L., 1753. Sweden.
Holcus alpinus Swartz in Willd., Sp. Pl. 4: 937. 1806. Lapland.
- Holcus monticola* Bigel., New England Jour. Med. and Surg. 5: 334. 1816; Eaton, Man. Bot. ed. 2. 273. 1818. White Hills, N. H., *Bigelow*.
- Dimesia monticola* Raf., Amer. Month. Mag. 1: 442. 1817. Based on *Holcus monticola* Bigel.
- Hierochloë alpina* var. *aristata* Raspail in Saig. and Rasp., Ann. Sci. Obs. 2: 85. 1829. Based on "H. alpina R. Br." (probably in Parry's Voyage), same as Roem. and Schult.
- Dimesia monticola* Raf. ex Jacks., Ind. Kew. 1: 760. 1893, as synonym of *Holcus monticola* Bigel.
- Savastana alpina* Scribn., Torrey Bot. Club Mem. 5: 34. 1894. Based on *Holcus alpinus* Swartz.
- Torresia alpina* Hitchc., Amer. Jour. Bot. 2: 300. 1915. Based on *Holcus alpinus* Swartz.
- (3) *Hierochloë occidentalis* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 100. 1862. Columbia woods, [Oregon], *Nuttall*.
- Hierochloë macrophylla* Thurb. ex Boland., Calif. Agr. Soc. Trans. 1864-65: 132. 1866; S. Wats., Bot. Calif. 2: 265. 1880. Coast Range, Calif., *Bolander* 2279.
- Savastana macrophylla* Beal, Grasses N. Amer. 2: 187. 1896. Based on *Hierochloë macrophylla* Thurb.
- Torresia macrophylla* Hitchc., Amer. Jour. Bot. 2: 300. 1915. Based on *Hierochloë macrophylla* Thurb.
- (2) *Hierochloë odorata* (L.) Beauv., Ess. Agrost. 62, 164. pl. 12. f. 5. 1812. Based on *Holcus odoratus* L.
- Holcus odoratus* L., Sp. Pl. 1048. 1753. Europe.
- Avena odorata* Koel., Descr. Gram. 299. 1802. Based on *Holcus odoratus* L.
- Holcus fragrans* Willd., Sp. Pl. 4: 936. 1806. Hudson Bay, Canada.
- Holcus borealis* Schrad., Fl. Germ. 1: 252. 1806. Germany.
- Hierochloë borealis* Roem. and Schult., Syst. Veg. 2: 513. 1817. Based on *Holcus borealis* Schrad.
- Hierochloa fragrans* Roem. and Schult., Syst. Veg. 2: 514. 1817. Based on *Holcus fragrans* Willd.
- Dimesia fragrans* Raf., Amer. Month. Mag. 1: 442. 1817. Based on "*Holcus fragrans* of Mx. and Pursh." In Michaux the name is *Holcus odoratus* L.
- Hierochloë arctica* Presl, Rel. Haenk. 1: 252. 1830. Nootka Sound, Vancouver Island, *Haenke*.
- Hierochloë odorata* var. *fragrans* Richt., Pl. Eur. 1: 31. 1890. Based on *Holcus fragrans* Willd.
- Savastana odorata* Scribn., Torrey Bot. Club Mem. 5: 34. 1894. Based on *Holcus odoratus* L.
- Savastana nashii* Bicknell, Torrey Bot. Club Bul. 25: 104. pl. 328. 1898. Van Cortlandt Park, New York City [*Bicknell* in 1897].
- Hierochloë nashii* Kaczmarek, Amer. Midl. Nat. 3: 198. 1914. Based on *Savastana nashii* Bicknell.
- Torresia odorata* Hitchc., Amer. Jour. Bot. 2: 301. 1915. Based on *Holcus odoratus* L.
- Hierochloa odorata* var. *fragrans* forma *eamesii* Fernald, Rhodora 19: 152. 1917. Connecticut, *Eames* 8734.
- Savastana odorata* var. *fragrans* Farwell, Mich. Acad. Sci. Rpt. 21: 350. 1920. Based on *Holcus fragrans* Willd.
- Torresia nashii* House, N. Y. State Mus. Bul. 243-244: 58. 1923. Based on *Savastana nashii* Bicknell.

(95) HILARIA H. B. K.

- (1) *Hilaria belangeri* (Steud.) Nash, N. Amer. Fl. 17: 135. 1912. Based on *Antheophora belangeri* Steud.
- Antheophora belangeri* Steud., Syn. Pl. Glum. 1: 111. 1854. "Mexico, *Belanger* 1428." Belanger is evidently an error for Berlandier, since *Berlandier* 1428, collected between Laredo and Bejar [Bexar], now Texas, agrees with the description. Belanger collected in India.
- Schleropelta stolonifera* Buckl., Prel. Rpt. Geol. Agr. Survey Tex. App. 1. 1866. Northwestern Texas.
- Hilaria cenchroides* var. *texana* Vasey, U. S. Natl. Herb. Contrib. 1: 53. 1890. Pena, Duval County, Tex., *Nealley* [600].
- Hilaria texana* Nash in Small, Fl. Southeast. U. S. 68. 1903. Based on *Hilaria cenchroides* var. *texana* Vasey.
- HILARIA BELANGERI var. LONGIFOLIA (Vasey) Hitchc., Biol. Soc. Wash. Proc. 41: 162. 1928. Based on *H. cenchroides* var. *longifolia* Vasey. (Published as *H. belangeri longifolia*.)
- Hilaria cenchroides* var. *longifolia* Vasey, Amer. Acad. Sci. Proc. 24: 80. 1889. name only; Beal, Grasses N. Amer. 2: 69. 1896. Islands in Guaymas harbor, Mexico, *Palmer* 347 in 1887.
- (4) *Hilaria jamesii* (Torr.) Benth., Linn. Soc. Jour., Bot. 19: 62. 1881. Based on *Pleuraphis jamesii* Torr.
- Pleuraphis jamesii* Torr., Ann. Lyc. N. Y. 1: 148. pl. 10. 1824. Sources of the Canadian River [Texas or New Mexico], *James*.
- Hilaria sericea* Benth., Linn. Soc. Jour., Bot. 19: 62. 1881. Name only.
- Pleuraphis sericea* Nutt. ex Benth., Linn. Soc. Jour., Bot. 19: 62. 1881, as synonym of *Hilaria sericea* Benth. [Harris Fork of the Colorado, *Nuttall*.]
- (3) *Hilaria mutica* (Buckl.) Benth., Linn. Soc. Jour., Bot. 19: 62. 1881. Based

on *Pleuraphis mutica* Buckl.

Pleuraphis mutica Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 95. 1862. Northern Texas [Wright 760-2108].

- (5) *Hilaria rigida* (Thurb.) Benth. ex Scribn., Torrey Bot. Club Bul. 9: 86. 1882. Based on *Pleuraphis rigida* Thurb.

Pleuraphis rigida Thurb. in S. Wats., Bot. Calif. 2: 293. 1880. California, Fort Mojave and Providence Mountains, Cooper [2230, the type]; Fort Yuma, Thomas; Colorado Desert, Schott.

- (2) *Hilaria swallenii* Cory, Wrightia 1: 215. 1948. Musquiz Canyon, Texas, July 28, 1938. Sperry T778, type.

(64) HOLCUS L.

- (1) *Holcus lanatus* L., Sp. Pl. 1048. 1753. Europe.

Aira holcus-lanata Vill., Hist. Pl. Dauph. 2: 87. 1787. Based on *Holcus lanatus* L.

Avena pallida Salisb., Prodr. Stirp. 24. 1796. Not *A. pallida* Thunb., 1794. Based on *Holcus lanatus* L.

Avena lanata Koel., Descr. Gram. 300. 1802. Based on *Holcus lanatus* L. Same published by Cav., Descr. Pl. 308. 1802.

Ginannia pubescens Bubani, Fl. Pyr. 4: 321. 1901. Based on *Holcus lanatus* L. *Notholcus lanatus* Nash ex Hitchc., in Jepson, Fl. Calif. 1: 126. 1912. Based on *Holcus lanatus* L.

Notholcus lanatus Nash in Britt. and Brown, Illustr. Fl. ed. 2. 1: 214. 1913. Based on *Holcus lanatus* L.

Ginannia lanata Hubb., Rhodora 18: 234. 1916. Based on *Holcus lanatus* L.

- (2) *Holcus mollis* L. Syst., Nat. ed. 10. 2: 1305. 1759. Europe.

Aira mollis Schreb., Spic. Fl. Lips. 51. 1771. Based on *Holcus mollis* L.

Aira holcus-mollis Vill., Hist. Pl. Dauph. 2: 88. 1787. Based on *Holcus mollis* L.

Avena sylvatica Salisb., Prodr. Stirp. 24. 1796. Based on *Holcus mollis* L.

Avena mollis Koel., Descr. Gram. 300. 1802. Not *A. mollis* Salisb., 1796. Based on *Holcus mollis* L.

Ginannia mollis Bubani, Fl. Pyr. 4: 321. 1901. Based on *Holcus mollis* L.

Notholcus mollis Hitchc., Amer. Jour. Bot. 2: 304. 1915. Based on *Holcus mollis* L.

(49) HORDEUM L.

- (6) *Hordeum arizonicum* Covas, Madroño 10: 16. 1949. Fort Lowell, Arizona, J. J. Thornber 536. Referred to *H. adscendens* H. B. K. in Manual ed. 1.

- (3) *Hordeum brachyantherum* Nevski, Acta Inst. Bot. Acad. Sci. U. R. S. S. I. 2: 61. 1936. Based on *H. boreale* Scribn. and Smith. Not *H. boreale* Gandog., 1881.

Hordeum boreale Scribn. and Smith, U. S.

Dept. Agr., Div. Agrost. Bul. 4: 24. 1897. Aleutian Islands [type, Atka Island, Turner 1193] and Alaska to California.

Hordeum nodosum var. *boreale* Hitchc., Amer. Jour. Bot. 21: 134. 1934. Based on *H. boreale* Scribn. and Smith.

This is the species to which the name *H. nodosum* L. has generally been misapplied in this country.

- (4) *Hordeum californicum* Covas and Stebbins, Madroño 10: 5. 1949. Hastings Reservation, Jamesburg, Monterey County, Calif. Stebbins 3944.

- (7) *Hordeum depressum* (Scribn. and Smith) Rydb., Torrey Bot. Club Bul. 36: 539. 1909. Based on *H. nodosum* var. *depressum* Scribn. and Smith.

Hordeum nodosum var. *depressum* Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 24. 1897. Type, Lexington, Oreg., Leiberg 39.

Hordeum distichon L., Sp. Pl. 85. 1753. Cultivated.

Hordeum hexastichon L., Sp. Pl. 85. 1753. Cultivated.

- (8) *Hordeum hystrix* Roth, Cat. Bot. 1: 23. 1797. Spain.

Hordeum gussonianum Parl., Fl. Palerm. 1: 246. 1845. Italy.

Hordeum maritimum var. *gussonianum* Richt., Pl. Eur. 1: 131. 1890. Based on *H. gussonianum* Parl.

Hordeum marinum var. *gussonianum* Thell., Vierteljahrs. Nat. Ges. Zürich 52: 441. 1908. Based on *H. gussonianum* Parl.

- (2) *Hordeum jubatum* L., Sp. Pl. 85. 1753. Canada, Kalm.

?*Critesion geniculatum* Raf., Jour. Phys. Chym. 89: 103. 1819. Illinois.

?*Elymus jubatus* Link, Hort. Berol. 1: 19. 1827. Garden specimen, *Hordeum jubatum* L., doubtfully cited as synonym.

Critesion jubatum Nevski in Komorov, Fl. U. R. S. S. 2: 721. 1934. Based on *Hordeum jubatum* L.

HORDEUM JUBATUM var. *CAESPITOSUM* (Scribn.) Hitchc., Biol. Soc. Wash. Proc. 41: 160. 1928. Based on *H. caespitosum* Scribn. (Published as *H. jubatum caespitosum*.)

Hordeum caespitosum Scribn., Davenport Acad. Sci. Proc. 7: 245. 1899. Edgemont, S. Dak., Pammel 143; Geranium Park, Wyo., Pammel 157 type.

- (9) *Hordeum leporinum* Link, Linnaea 9: 133. 1835. Greece.

Hordeum murinum var. *leporinum* Arcang. Comp. Fl. Ital. 805. 1882. Based on *H. leporinum* Link. This and *H. stebbinsii* have been referred to *Hordeum murinum* L. by American authors.

Hordeum marinum Huds., Fl. Angl. ed. 2. 57. 1778. England.

Hordeum maritimum With., Bot. Arr. Veg. Brit. ed. 2. 1: 127. 1787. Based

- on *H. marinum* Huds.
- (1) *Hordeum montanense* Scribn. in Beal, Grasses N. Amer. 2: 644. 1896. Montana, Scribner 429, 430.
- Hordeum pammelii* Scribn. and Ball, Iowa Geol. Survey Sup. Rpt. 1903: 335. 1905. Dakota City, Iowa, Pammel 3824.
- (5) *Hordeum pusillum* Nutt., Gen. Pl. 1: 87. 1818. Plains of the Missouri [Nut-tall].
- Hordeum riehlui* Steud., Syn. Pl. Glum. 1: 353. 1854. St. Louis, Mo., Riehl 181.
- HORDEUM PUSILLUM* var. *PUBENS* Hitchc., Wash. Acad. Sci. Jour. 23: 453. 1933. La Verkin, Utah, Jones 5196W.
- Hordeum spontaneum* C. Koch, Linnaea 21: 430. 1848. Caucasus.
- (10) *Hordeum stebbinsii* Covas, Madroño 10: 17. 1949. Middletown, Lake County, Calif., G. L. Stebbins and G. Covas 3927.
- (11) *Hordeum vulgare* L., Sp. Pl. 84. 1753. Cultivated in Europe.
- Hordeum sativum* Pers., Syn. Pl. 1: 108. 1805, as synonym of *H. vulgare* L.
- Hordeum polystichum* var. *vulgare* Doell, Rhein. Fl. 67. 1843. Based on *H. vulgare* L.
- Hordeum sativum* var. *vulgare* Richt., Pl. Eur. 1: 130. 1890. Based on *H. vulgare* L.
- HORDEUM VULGARE* var. *TRIFURCATUM* (Schlecht.) Alefeld, Landw. Fl. 341. 1866. Based on *H. trifurcatum* Jess. (probably error for Wender.).
- Hordeum coeleste* var. *trifurcatum* Schlecht., Linnaea 11: 543. 1837. Cultivated at Halle, seed from Montpellier.
- Hordeum trifurcatum* Wender, Flora 26: 233. 1843. Cultivated in Marburg, Germany.
- (124) **HYDROCHLOA** Beauv.
- (1) *Hydrochloa caroliniensis* Beauv., Ess. Agrost. 135, 165, 182. pl. 3. f. 18; pl. 24. f. 4. 1812. No specific description except explanation of figures. "*Zizania natans* Michx." (an unpublished name) is cited under the genus, and *Z. fluitans* Michx. is referred in the index to *Hydrochloa*. The name for pl. 3. f. 18 is given as *H. caroliniana*.
- Zizania fluitans* Michx., Fl. Bor. Amer. 1: 75. 1803. Not *Hydrochloa fluitans* Hartm., 1819. The published locality, Lake Champlain, is an error. The type specimen indicates Charleston, S. C., Michaux.
- Zizania natans* Michx. ex Beauv., Ess. Agrost. 136. 1812, name only; Bosc in Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 3^e: 186. 1840, as synonym of *Hydrochloa caroliniensis* Beauv. The name is misspelled *Zizania natans* in Steud., Nom. Bot. ed. 2. 2: 799. 1841.
- Luziola caroliniensis* Raspail, Ann. Sci. Nat., Bot. 5: 304. 1825. Based on *Hydrochloa caroliniensis* Beauv.
- Hydrochloa fluitans* Torr., Comp. Fl. North. Mid. States 354, 403. 1826. Not *H. fluitans* Hartm., 1819. Based on *Zizania fluitans* Michx.
- Hydropyrum fluitans* Kunth, Rév. Gram. 1: 7. 1829. Based on *Zizania fluitans* Michx.
- Luziola caroliniana* Trin. ex Steud., Nom. Bot. ed. 2. 2: 79. 1841. Based on *Zizania natans* "Bosc in Kunth hrb. (ex Trin. mpt.)."
- (155) **HYPARRHENIA** Anderss. ex Stapf
- Hyparrhenia hirta* (L.) Stapf in Prain, Fl. Trop. Afr. 9: 315. 1918. Based on *Andropogon hirtus* L.
- Andropogon hirtus* L., Sp. Pl. 1046. 1753. Southern Europe and Asia Minor.
- Trachypogon hirtus* Nees, Agrost. Bras. 346. 1829. Based on *Andropogon hirtus* L.
- Sorghum hirtum* Kuntze, Rev. Gen. Pl. 2: 792. 1891. Based on *Andropogon hirtus* L.
- (1) *Hyparrhenia rufa* (Nees) Stapf in Prain, Fl. Trop. Afr. 9: 304. 1918. Based on *Trachypogon rufus* Nees.
- Trachypogon rufus* Nees, Agrost. Bras. 345. 1829. Piauhy, Brazil, Martius.
- Andropogon rufus* Kunth, Rév. Gram. 1: Sup. 39. 1830. Based on *Trachypogon rufus* Nees.
- Sorghum rufum* Kuntze, Rev. Gen. Pl. 2: 792. 1891. Based on *Andropogon rufus* Kunth.
- Cymbopogon rufus* Rendle, Cat. Afr. Pl. Welw. 2: 155. 1899. Based on *Andropogon rufus* Kunth.
- (48) **HYSTRIX** Moench
- (2) *Hystrix californica* (Boland.) Kuntze, Rev. Gen. Pl. 2: 778. 1891. Based on *Gymnostichum californicum* Boland.
- Gymnostichum californicum* Boland. ex Thurb., in S. Wats. Bot. Calif. 2: 327. 1880. Near San Francisco, Bolander; Sausalito, Kellogg and Harford 1107.
- Asperella californica* Beal, Grasses N. Amer. 2: 657. 1896. Based on *Gymnostichum californicum* Boland.
- Asprella californica* Benth. ex Beal, Grasses N. Amer. 2: 657. 1896, as synonym of *Asperella californica*.
- (1) *Hystrix patula* Moench, Meth. Pl. 295. 1794. Based on *Elymus hystrix* L.
- Elymus hystrix* L., Sp. Pl. 560. 1753. [Virginia, Clayton.]
- Asperella hystrix* Humb., Mag. Bot. Roem. et Ust. 7: 5. 1790. Based on *Elymus hystrix* L.
- Asprella hystrix* Willd., Enum. Pl. 132. 1809. Based on *Elymus hystrix* L.
- Gymnostichum hystrix* Schreb., Besch. Gräs. 2: 127. pl. 47. 1810. Based on

- Elymus hystrix* L.
Zeocrilon hystrix Beauv., Ess. Agrost. 115, 182. 1812. Presumably based on *Elymus hystrix* L.
Asperella echidnea Raf., Amer. Monthly Mag. 4: 190. 1819. Based on *Elymus hystrix* L.
Elymus pseudohystrix Schult., Mantissa 2: 427. 1824. Based on "*Elymus hystrix* Nutt." (error for L., Nuttall applying the Linnaean name correctly).
Asprella americana Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 151. 1837. Arkansas, Nuttall.
Asprella angustifolia Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 151. 1837. Arkansas, Nuttall.
Asprella major Fres. ex Steud., Nom. Bot. ed. 2. 1: 152. 1840, as synonym of *Elymus hystrix* L.
Hystrix hystrix Millsp., Fl. W. Va. 474. 1892. Based on *Elymus hystrix* L.
Hystrix elymoides Mackenz. and Bush, Man. Fl. Jackson County 39. 1902. Based on *Elymus hystrix* L.
Hordeum hystrix Schenck, Bot. Jahrb. 40: 109. 1907. Not *H. hystrix* Roth, 1797. Based on *Elymus hystrix* L.
Gymnostichum patulum Lunell, Amer. Midl. Nat. 4: 228. 1915. Based on *Hystrix patula* Moench.
Asperella hystrix var. *bigeloviana* Fernald, Rhodora 24: 230. 1922. Hanover, Conn., Williams in 1910.
Hystrix patula var. *bigeloviana* Deam, Ind. Dept. Conserv. Pub. 82: 117. 1929. Based on *Asperella hystrix* var. *bigeloviana* Fernald.
Elymus californicus Gould, Madroño 9: 127. 1947. Based on *Gymnostichum californicum* Boland.

(148) IMPERATA Cyrillo

- (1) *Imperata brasiliensis* Trin., Acad. St. Pétersb. Mém. VI. Math. Phys. Nat. 2: 331. 1832. Brazil.
Imperata brasiliensis var. *mexicana* Rupr., Acad. Sci. Brux. Bul. 9²: 245. 1842. Name only. Mexico, Galeotti 5678.
Imperata arundinacea var. *americana* Anderss., Öfv. Svensk. Vet. Akad. Förh. 12: 160. 1855. British Guiana, Schomburgk 665; Mexico, Galeotti 5678; Chile, d'Urville.
This is the species described as *Imperata caudata* Cyrillo in Chapm., Fl. South. U.S. ed. 2. 668. 1883.
(2) *Imperata brevifolia* Vasey, Torrey Bot. Club Bul. 13: 26. 1886. Southern California, Parish 1031.
Imperata arundinacea subsp. *hookeri* Rupr. ex Anderss., Öfv. Svensk. Vet. Akad. Förh. 12: 160. 1855. Texas, Drummond II. 283.
Imperata hookeri Rupr. ex Hack. in DC. Monogr. Phan. 6: 97. 1889. Based on

- Imperata arundinacea* subsp. *hookeri* Rupr. ex Anderss.
Imperata cylindrica (L.) Beauv., Ess. Agrost. 8, 165, 166, 177. pl. 5. f. 1. 1812. Based on *Lagurus cylindricus* L.
Lagurus cylindricus L., Syst. Nat. ed. 10. 2: 878. 1759. Europe.
Saccharum cylindricum Lam., Encycl. 1: 594. 1783. Based on *Lagurus cylindricus* L.
Imperata arundinacea Cyrillo, Pl. Rar. Neap. 2: 27. pl. 11. 1788. Italy.

(55) KOELERIA Pers.

- (1) *Koeleria cristata* (L.) Pers., Syn. Pl. 1: 97. 1805. "*Poa cristata* auctorum," presumably *Poa cristata* L., used by Willd. (Sp. Pl. 1: 402. 1797), Lamarek (Tabl. Encycl. 1: 182. 1791), and others.
Aira cristata L., Sp. Pl. 63. 1753. Europe.
Poa cristata L., Syst. Nat. ed. 12. 94. 1767. Based on *Aira cristata* L.
Festuca cristata Vill., Hist. Pl. Dauph. 1: 250. 1786. Not *F. cristata* L., 1753. Based on *Aira cristata* L.
Koeleria gracilis Pers., Syn. Pl. 1: 97. 1805. Europe.
Koeleria nitida Nutt., Gen. Pl. 1: 74. 1818. Plains of the Missouri.
Aira gracilis Trin., Fund. Agrost. 144. 1820. Based on *Koeleria gracilis* Pers.
Airochloa cristata Link, Hort. Berol. 1: 127. 1827. Based on *Aira cristata* L. The specific name was misspelled "*aristata*" in Link, Handb. Gewächs. 1: 64. 1829.
Airochloa gracilis Link, Hort. Berol. 2: 276. 1827. Based on *Koeleria gracilis* Pers.
Koeleria cristata var. *nuttalii* Wood, Class-book ed. 2. 613. 1847. Presumably based on *K. nitida* Nutt.
Koeleria cristata var. *gracilis* A. Gray, Man. 591. 1848. No definite locality cited. Presumably based on *K. gracilis* Pers.
Brachystylus cristatus Dulac, Fl. Haut. Pyr. 85. 1867. Based on *Koeleria cristata* Pers.
Koeleria nitida var. *arkansana* Scribn., Kans. Acad. Sci. Trans. 9: 118. 1885. [Arkansas.]
Koeleria arkansana Nutt. ex Scribn., Kans. Acad. Sci. Trans. 9: 118. 1885, [Arkansas, Nuttall] as synonym of *K. nitida* var. *arkansana*.
Achaeta geniculata Fourn., Mex. Pl. 2: 109. 1886. Mexico, Liebmam 609.
Koeleria cristata var. *major* Vasey in Macoun, Can. Pl. Cat. 2⁴: 218. 1888. Not *K. cristata* var. *major* Koch, 1837. Name only, for Macoun, Vancouver Island.
Koeleria cristata var. *pubescens* Vasey ex Davy in Jepson, Fl. West. Mid. Calif.

62. 1901. Not *K. cristata* var. *pubescens* Mutel, 1837. San Francisco, Calif., *Michener* and *Bioletti*.
- Koeleria cristata* var. *longifolia* Vasey ex Davy in Jepson, Fl. West. Mid. Calif. 62. 1901. Santa Cruz County, Calif., *Anderson*.
- Koeleria cristata* *pinetorum* Abrams, Fl. Los Angeles 46. 1904. Based on *K. cristata* var. *pubescens* Vasey.
- Koeleria pseudocristata* var. *californica* Domin, Magyar Bot. Lapok 3: 264. 1904. San Diego, Calif., *Pringle* in 1882.
- Koeleria elegantula* Domin, Bibl. Bot. 65: 172. 1907. Gunnison, Colo., *Baker* 578.
- Koeleria robinsoniana* Domin, Bibl. Bot. 65: 172. 1907. Wenatchee, Wash., *Whited* 1131.
- Koeleria robinsoniana* var. *australis* Domin, Bibl. Bot. 65: 173. 1907. Blalocks, Oreg., *Leckenby* 28 in 1900.
- Koeleria gracilis* var. *dasyclada* Domin, Bibl. Bot. 65: 211. 1907. California, *Lemmon* in 1882.
- Koeleria pseudocristata* Domin, Bibl. Bot. 65: 222. 1907. With two American forms: *densevestita*, California, *Hall* 2206; *laxa*, California, *Heller* 7443.
- Koeleria pseudocristata* var. *longifolia* Domin, Bibl. Bot. 65: 224. 1907. California, *Nuttall*.
- Koeleria pseudocristata* var. *oregona* Domin, Bibl. Bot. 65: 224. 1907. Oregon, *Nuttall*.
- Koeleria pseudocristata* var. *pseudonitida* Domin, Bibl. Bot. 65: 224. 1907. Wyoming, *Nelson* 273.
- Koeleria polyantha* var. *californiensis* Domin, Bibl. Bot. 65: 226. 1907. San Jacinto Mountains, Calif., *Hall* 2131.
- Koeleria nitida* var. *missouriana* Domin, Bibl. Bot. 65: 233. 1907. St. Louis, *Riehl* 44; Courtney, Mo., *Bush* 773.
- Koeleria nitida* var. *californica* Domin, Bibl. Bot. 65: 233. 1907. Based on *K. pseudocristata* var. *californica* Domin. With three subvarieties from California: *transiens*, *Brandeggee* 3678; *multiflora*, *Parish Brothers* 855; *vestita*, *Palmer* 405.
- Koeleria nitida* var. *sublanuginosa* Domin, Bibl. Bot. 65: 234. 1907. Miranda, S. Dak., *Griffiths* 235. With subvar. *pubiflora*, Washington, *Lyall* in 1860.
- Koeleria nitida* var. *laxa* Domin, Bibl. Bot. 65: 235. 1907. Arizona, *Palmer* in 1890; New Mexico, *Metcalf*.
- Koeleria nitida* var. *subrepens* Domin, Bibl. Bot. 65: 235. 1907. Arboles, Colo., *Baker* 185.
- Koeleria nitida* var. *munita* Domin, Bibl. Bot. 65: 235. 1907. Montana, *Rydberg* 3294.
- Koeleria nitida* var. *latifrons* Domin, Bibl. Bot. 65: 236. 1907. Nebraska, *Rydberg*.
- Koeleria nitida* var. *breviculmis* Domin, Bibl. Bot. 65: 236. 1907. Colorado, *Baker*, *Earle*, and *Tracy* 114.
- Koeleria nitida* var. *caudata* Domin, Bibl. Bot. 65: 236. 1907. Wisconsin, *Kumlien* 99.
- Koeleria idahoensis* Domin, Bibl. Bot. 65: 237. 1907. Lewiston, Idaho, *Heller* 309 (error for 3091).
- Koeleria idahoensis* var. *pseudocristatoides* Domin, Bibl. Bot. 65: 238. 1907. Nez Perce County, Idaho, *Heller* 3291.
- Koeleria macrura* Domin, Bibl. Bot. 65: 238. 1907. With three forms: *quadriflora*, Arizona, *Nealley* in 1891; *triflora*, Organ Mountains, N. Mex., *Wootton* 110; *biflora*, Chiricahua Mountains, Ariz., *Toumey* in 1896.
- Koeleria latifrons* Rydb., Brittonia 1: 84. 1931. Based on *K. nitida* var. *latifrons* Domin.
- (2) *Koeleria phleoides* (Vill.) Pers., Syn. Pl. 1: 97. 1805. Based on *Festuca phleoides* Vill.
- Festuca phleoides* Vill., Fl. Delph. 7. 1785. Europe.
- Koeleria brachystachys* DC., Cat. Hort. Monsp. 120. 1813. Europe.
- Lophochloa phleoides* Reichenb., Fl. Germ. 42. 1830. Based on *Festuca phleoides* Vill.

(81) LAGURUS L.

- (1) *Lagurus ovatus* L., Sp. Pl. 81. 1753. Southern Europe.

(25) LAMARCKIA Moench

- (1) *Lamarckia aurea* (L.) Moench, Meth. Pl. 201. 1794. Based on *Cynosurus aureus* L.
- Cynosurus aureus* L., Sp. Pl. 73. 1753. Europe.
- Chrysurus cynosuroides* Pers., Syn. Pl. 1: 80. 1805. Based on *Cynosurus aureus* L.
- Chrysurus aureus* Beauv. ex Spreng., Syst. Veg. 1: 296. 1825. Based on *Cynosurus aureus* L.
- Achyrodes aureum* Kuntze, Rev. Gen. Pl. 2: 758. 1891. Based on *Cynosurus aureus* L.

(138) LASIACIS (Griseb.) Hitchc.

- (1) *Lasiacis divaricata* (L.) Hitchc., U. S. Natl. Herb. Contrib. 15: 16. 1910. Based on *Panicum divaricatum* L.
- Panicum divaricatum* L., Syst. Nat. ed. 10. 2: 871. 1759. Jamaica, *Browne*.
- Panicum bambusoides* Desv. ex Hamilt., Prodr. Pl. Ind. Occ. 10. 1825. Puerto Rico.
- Panicum chawinii* Steud., Syn. Pl. Glum. 1: 68. 1854. Guadeloupe, *Duchassaing*.
- Panicum divaricatum* var. *stenostachyum* Griseb., Fl. Brit. W. Ind. 551. 1864.

Jamaica, Alexander, Wilson, March [type].

(120) **LEERSIA** Swartz

- (4) **Leersia hexandra** Swartz, Prodr. Veg. Ind. Occ. 21. 1788. Jamaica, Swartz.
Asprella hexandra Beauv., Ess. Agrost. 2, 153. 1812. Based on *Leersia hexandra* Swartz.
Leersia mexicana H. B. K., Nov. Gen. et Sp. 1: 195. 1816. Mexico, Humboldt and Bonpland.
Asprella mexicana Roem. and Schult., Syst. Veg. 2: 267. 1817. Based on *Leersia mexicana* H. B. K.
Leersia contracta Nees, Agrost. Bras. 516. 1829. Brazil, Sellow.
Leersia elongata Willd. ex Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 3¹: 172. 1840, as synonym of *L. mexicana* H. B. K.
Oryza hexandra Doell in Mart., Fl. Bras. 2²: 10. 1871. Based on *Leersia hexandra* Swartz.
Oryza mexicana Doell in Mart., Fl. Bras. 2²: 10. 1871. Based on *Leersia mexicana* H. B. K.
Leersia gouvini Fourn., Mex. Pl. 2: 2. 1886. Vera Cruz, Mexico, Gouin.
Homalocenchrus gouvini Kuntze, Rev. Gen. Pl. 2: 777. 1891. Based on *Leersia gouvini* Fourn.
Homalocenchrus hexandrus Kuntze, Rev. Gen. Pl. 2: 777. 1891. Based on *Leersia hexandra* Swartz.
Leersia dubia Areschoug, Svensk Freg. Eugenies Resa 1910: 115. 1910. Ecuador, Andersson.
(1) **Leersia lenticularis** Michx., Fl. Bor. Amer. 1: 39. 1803. Illinois, Michaux.
Asprella lenticularis Beauv., Ess. Agrost. 2, 153. 1812. Based on *Leersia lenticularis* Michx.
Zizania lenticularis Michx. ex Beauv., Ess. Agrost. 182. 1812. Name only, doubtless error for *Leersia lenticularis* Michx.
Homalocenchrus lenticularis Kuntze, Rev. Gen. Pl. 2: 777. 1891. Based on *Leersia lenticularis* Michx.
Endodia lenticularis Raf. ex Jacks., Ind. Kew. 1: 840. 1893, as synonym of *Leersia lenticularis* Michx.
(5) **Leersia monandra** Swartz, Prodr. Veg. Ind. Occ. 21. 1788. Jamaica, Swartz.
Asprella monandra Beauv., Ess. Agrost. 2, 153. 1812. Based on *Leersia monandra* Swartz.
Paspalum cubense Spreng., Neu. Entd. 3: 12. 1822. Cuba and neighboring islands.
Oryza monandra Doell in Mart., Fl. Bras. 2²: 9. 1871. Based on *Leersia monandra* Swartz.
Homalocenchrus monandrus Kuntze, Rev. Gen. Pl. 2: 777. 1891. Based on *Leersia monandra* Swartz.

- (2) **Leersia oryzoides** (L.) Swartz, Prodr. Veg. Ind. Occ. 21. 1788. Based on *Phalaris oryzoides* L.
Phalaris oryzoides L., Sp. Pl. 55. 1753. Virginia.
Homalocenchrus oryzoides Poll., Hist. Pl. Palat. 1: 52. 1776. Based on *Phalaris oryzoides* L.
Ehrhartia clandestina Web., Prim. Fl. Hols. 64. 1780. Based on *Phalaris oryzoides* L.
Asperella oryzoides Lam., Tabl. Encycl. 1: 167. 1791. Based on *Phalaris oryzoides* L.
Asprella oryzoides Beauv., Ess. Agrost. 2, 153. pl. 4. f. 2. 1812. Based on *Phalaris oryzoides* L.
Leersia asperima Willd. ex Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 3¹: 171. 1840, as synonym of *L. oryzoides* Swartz.
Oryza clandestina A. Br. in Aschers., Fl. Brand. 799. 1864. Based on *Ehrhartia clandestina* Web.
Laertia oryzoides Gromow. in Trautv., Act. Hort. Petrop. 9: 354. 1884. Error for *Leersia oryzoides* Swartz.
Oryza clandestina forma *inclusa* Wiesb. in Baenitz., Deut. Bot. Monatschr. 15: 19. 1897. Hungary.
Leersia oryzoides forma *glabra* A. A. Eaton, Rhodora 5: 118. 1903. Newburyport, Mass.
Oryza oryzoides Dalla Torre and Sarnth., Fl. Tirol 6: 142. 1906. Based on *Phalaris oryzoides* L.
Leersia oryzoides forma *inclusa* Dörfl., Herb. Norm. Sched. Cent. 55-56. 164. 1915. Based on *Oryza clandestina* forma *inclusa* Wiesb. (Published as new, Fogg, Rhodora 30: 84. 1928, same basis.)
(3) **Leersia virginica** Willd., Sp. Pl. 1: 325. 1797. North America.
Asprella virginica Beauv., Ess. Agrost. 2, 153. 1812. Based on *Leersia virginica* Willd.
Leersia imbricata Poir. in Lam., Encycl. Sup. 3: 329. 1813. Carolina, Bosc.
Leersia ovata Poir. in Lam., Encycl. Sup. 3: 329. 1813. North America.
Asprella ovata Roem. and Schult., Syst. Veg. 2: 267. 1817. Based on *Leersia ovata* Poir.
Asprella imbricata Roem. and Schult., Syst. Veg. 2: 268. 1817. Based on *Leersia imbricata* Poir.
Leersia virgata Raf., Bot. Seringe Bul. 1: 220. 1830 [probably error for *L. virginica*]. Cited as type of the genus *Aplexia*, but the name not transferred.
Homalocenchrus virginicus Britton, N. Y. Acad. Sci. Trans. 9: 14. 1889. Based on *Leersia virginica* Willd.
Homalocenchrus ovata Kuntze, Rev. Gen. Pl. 2: 777. 1891. Based on *Leersia ovata* Poir.

Aplexia virgata Raf. ex Jacks., Ind. Kew. 1: 162. 1893, as synonym of *Leersia virginica*.

Aplexia virginica Raf. ex Jacks., Ind. Kew. 1: 162. 1893, as synonym of *Leersia virginica*.

Leersia virginica var. *ovata* Fernald, Rhodora 38: 386. pl. 440. f. 9-13. 1936. Based on *L. ovata* Poir.

(97) **LEPTOCHLOA** Beauv.

- (2) **Leptochloa chloridiformis** (Hack.) Parodi, Physis 4: 184. 1918. Based on *Diplachne chloridiformis* Hack.

Diplachne chloridiformis Hack. in Stuck., An. Mus. Nac. Buenos Aires 13: 498. 1906. Prov. Córdoba, Argentina, Stuckert 2329.

Baldomiria chloridiformis Herter, Rev. Sudamer. Bot. 6: 145. 1940. Based on *Diplachne chloridiformis* Hack.

- (4) **Leptochloa domingensis** (Jacq.) Trin., Fund. Agrost. 133. 1820. Based on *Cynosurus domingensis* Jacq.

Cynosurus domingensis Jacq., Misc. Austr. 2: 363. 1781. Dominican Republic.

Festuca domingensis Lam., Tabl. Encycl. 1: 189. 1791. Based on *Cynosurus domingensis* Jacq.

Eleusine domingensis Pers., Syn. Pl. 1: 87. 1805. Based on *Cynosurus domingensis* Jacq.

Rabdochloa domingensis Beauv., Ess. Agrost. 84, 176. 1812. Based on *Cynosurus domingensis* Jacq.

Leptostachys domingensis G. Meyer, Prim. Fl. Esseq. 74. 1818. Based on *Eleusine domingensis* Pers.

Cynodon domingense Raspail, Ann. Sci. Nat., Bot. 5: 302. 1825. Based on *Rabdochloa domingensis* Beauv.

Leptochloa virgata var. *domingensis* Link ex Griseb., Fl. Brit. W. Ind. 538. 1864. Based on *L. domingensis* Link (same as *L. domingensis* Trin.).

Diplachne domingensis Chapm., Fl. South. U. S. ed. 3. 609. 1897. Based on *Leptochloa domingensis* Link (same as *L. domingensis* Trin.).

- (1) **Leptochloa dubia** (H. B. K.) Nees, Syll. Pl. Ratisb. 1: 4. 1824. Based on *Chloris dubia* H. B. K.

Chloris dubia H. B. K., Nov. Gen. et Sp. 1: 169. 1816. Mexico, Humboldt and Bonpland.

Leptostachys dubia G. Meyer, Prim. Fl. Esseq. 74. 1818. Based on *Chloris dubia* H. B. K.

Festuca obtusiflora Willd. ex Spreng., Syst. Veg. 1: 356. 1825. Mexico.

Schismus patens Presl, Rel. Haenk. 1: 269. 1830. Chile, Haenke.

Leptochloa patens Kunth, Rév. Gram. 1: Sup. 22. 1830. Based on *Schismus patens* Presl.

Leptochloa obtusiflora Trin. ex Steud.,

Nom. Bot. ed. 2. 2: 30. 1841, as synonym of *L. dubia* Nees.

Diplachne patens Desv. in Gay, Fl. Chil. 6: 371. 1853. Based on *Schismus patens* Presl.

Uralepis brevicuspidata Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 93. 1862. Texas [Wright 767].

Ipnum mendocinum R. A. Phil., An. Univ. Chile 36: 211. 1870. Mendoza, Argentina.

Diplachne dubia Scribn., Torrey Bot. Club Bul. 10: 30. 1883. Based on *Leptochloa dubia* Nees.

Molinia retusa Griseb. ex Fourn., Mex. Pl. 2: 147. 1886, as synonym of *Leptochloa dubia* Nees.

Diplachne dubia var. *aristata* Vasey, Calif. Acad. Sci. Proc. II. 2: 213. 1889. Name only. Baja California, Brandegee.

Leptochloa pringlei Beal, Grasses N. Amer. 2: 436. 1896. Arizona, Pringle in 1884.

Diplachne pringlei Vasey ex Beal, Grasses N. Amer. 2: 436. 1896, as synonym of *Leptochloa pringlei*.

Diplachne mendocina Kurtz, Bol. Acad. Cienc. Córdoba 15: 521. 1897. Based on *Ipnum mendocinum* R. A. Phil.

Diplachne dubia var. *pringleana* Kuntze, Rev. Gen. Pl. 3²: 349. 1898. Chihuahua, Mexico, Pringle 422.

Diplachne dubia var. *humboldtiana* Kuntze, Rev. Gen. Pl. 3²: 349. 1898. Presumably the original form collected by Humboldt and Bonpland.

Leptochloa dubia pringleana Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 24: 27. 1901. Based on *Diplachne dubia* var. *pringleana* Kuntze.

Rabdochloa dubia Kuntze ex Stuck., An. Mus. Nac. Buenos Aires 11: 121. 1904. Based on *Leptochloa dubia* Nees.

Sieglingia dubia Kuntze ex Stuck., An. Mus. Nac. Buenos Aires 11: 128. 1904. Based on *Chloris dubia* H. B. K.

Eragrostis mendocina Jedw., Bot. Archiv Mez 5: 192. 1924. Based on *Ipnum mendocinum* Phil.

- (7) **Leptochloa fascicularis** (Lam.) A. Gray, Man. 538. 1848. Based on *Festuca fascicularis* Lam.

Festuca fascicularis Lam., Tabl. Encycl. 1: 189. 1791. South America.

Festuca polystachya Michx., Fl. Bor. Amer. 1: 66. 1803. Illinois, Michaux.

Diplachne fascicularis Beauv., Ess. Agrost. 81, 160. pl. 16. f. 9. 1812. Based on *Festuca fascicularis* Lam.

Festuca procumbens Muhl., Descr. Gram. 160. 1817. Carolina. Name only, Muhl., Cat. Pl. 13. 1813.

Festuca clandestina Muhl., Descr. Gram. 162. 1817. New York. Name only, Muhl., Cat. Pl. 13. 1813.

Festuca aquatica Bosc ex Roem. and Schult., Syst. Veg. 2: 615. 1817, as

- synonym of *Diplachne fascicularis* Beauv.
- Cynodon fascicularis* Raspail, Ann. Sci. Nat. Bot. 5: 303. 1825. Based on *Diplachne fascicularis* Beauv.
- Leptochloa polystachya* Kunth, Rév. Gram. 1: 91. 1829. Based on *Festuca polystachya* Michx.
- Diachroa procumbens* Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 147. 1837. Based on *Festuca procumbens* Muhl.
- Festuca texana* Steud., Syn. Pl. Glum. 1: 310. 1854. Texas, Drummond 387.
- Uralepsis composita* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 94. 1862. New Mexico, Woodhouse.
- Diplachne patens* Fourn. ex Hemsl., Biol. Centr. Amer. Bot. 3: 570. 1885, name only; Mex. Pl. 2: 148. 1886. Not *D. patens* Desv., 1853. Vera Cruz, Mexico, Gouin 93.
- Diplachne tracyi* Vasey, Torrey Bot. Club Bul. 15: 40. 1888. Reno, Nev., Tracy [216].
- Leptochloa tracyi* Beal, Grasses N. Amer. 2: 436. 1896. Based on *Diplachne tracyi* Vasey.
- Festuca prostrata* Muhl. ex Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 27: 5. 1900, as synonym of *F. procumbens* Muhl.
- Diplachne procumbens* Nash in Britton, Man. 128. 1901. Not *D. procumbens* Arech., 1896. Based on *Festuca procumbens* Muhl.
- Diplachne acuminata* Nash in Britton, Man. 128. 1901. Arkansas to Nebraska and Colorado. [Type, Kansas, Thompson.]
- Diplachne maritima* Bicknell, Torrey Bot. Club Bul. 35: 195. 1908. Based on *D. procumbens* Nash.
- (5) *Leptochloa filiformis* (Lam.) Beauv., Ess. Agrost. 71, 161, 166. 1812. Based on *Festuca filiformis* Lam.
- Festuca filiformis* Lam., Tabl. Encycl. 1: 191. 1791. South America.
- Eleusine mucronata* Michx., Fl. Bor. Amer. 1: 65. 1803. Illinois, Michaux.
- Eleusine filiformis* Pers., Syn. Pl. 1: 87. 1805. South America.
- Eleusine sparsa* Muhl., Cat. Pl. 12. 1813. Based on *E. filiformis* Pers.; Descr. Gram. 135. 1817. Carolina and Georgia.
- Oxydenia attenuata* Nutt., Gen. Pl. 1: 76. 1818. New Orleans, La. [Nuttall].
- Leptostachys filiformis* G. Meyer, Prim. Fl. Esseq. 74. 1818. Based on *Eleusine filiformis* Pers.
- Leptochloa mucronata* Kunth, Rév. Gram. 1: 91. 1829. Based on *Eleusine mucronata* Michx.
- Aira panicea* Willd. ex Steud., Nom. Bot. ed. 2. 1: 45. 1840, as synonym of *Leptochloa filiformis* Beauv.
- Eleusine stricta* Willd. ex Steud. Nom. Bot. ed. 2. 1: 549. 1840. Not *E. stricta* Roxb., 1820. As synonym of *Leptochloa filiformis* Beauv.
- Eleusine elongata* Willd. ex Steud., Nom. Bot. ed. 2. 1: 549. 1840, as synonym of *Leptochloa filiformis* Beauv.
- Leptochloa brachiata* Steud., Syn. Pl. Glum. 1: 209. 1854. Guadeloupe, Duchassaing.
- Leptochloa attenuata* Steud., Syn. Pl. Glum. 1: 209. 1854. Based on *Oxydenia attenuata* Nutt.
- Leptochloa pellucidula* Steud., Syn. Pl. Glum. 1: 209. 1854. Panama, Duchassaing.
- Leptochloa paniculata* Fourn., Soc. Bot. France Bul. II. 27: 296. 1880. Nicaragua, Levy 1079.
- Leptochloa mucronata* var. *pulchella* Scribn., Torrey Bot. Club Bul. 9: 147. 1882. Santa Cruz Valley, Ariz., Pringle in 1881.
- Oxydenia filiformis* Nutt. ex Jacks., Ind. Kew. 2: 392. 1894, as synonym of *Leptochloa filiformis* Beauv.
- Leptochloa pilosa* Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 32: 9. 1901. Travis County, Tex., Bodin 294 in 1891.
- Leptochloa filiformis* forma *attenuata* Gates, Kans. State Col. Agr., Dept. Bot. Contrib. 391: 130. 1940. Based on *Oxydenia attenuata* Nutt.
- (9) *Leptochloa nealleyi* Vasey, Torrey Bot. Club Bul. 12: 7. 1885. Texas, Nealley.
- Leptochloa stricta* Fourn., Mex. Pl. 2: 147. 1886. Vera Cruz, Mexico, Gouin 73.
- (11) *Leptochloa panicoides* (Presl) Hitchc., Amer. Jour. Bot. 21: 137. 1934. Based on *Megastachya panicoides* Presl. (Not invalidated by *L. panicoides* Wight, 1854; listed as a synonym only.)
- Megastachya panicoides* Presl, Rel. Haenk. 1: 283. 1830. Acapulco, Mexico, Haenke.
- Poa panicoides* Kunth, Rév. Gram. 1: Sup. 28. 1830. Based on *Megastachya panicoides* Presl.
- Eragrostis panicoides* Steud., Syn. Pl. Glum. 1: 278. 1854. Based on *Megastachya panicoides* Presl.
- Leptochloa floribunda* Doell in Mart., Fl. Bras. 2³: 89. 1878. Amazon River, Brazil.
- Diplachne halei* Nash, N. Y. Bot. Gard. Bul. 1: 292. 1899. Louisiana, Hale.
- Leptochloa halei* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 24: 27. 1901. Based on *Diplachne halei* Nash.
- (10) *Leptochloa scabra* Nees, Agrost. Bras. 435. 1829. Amazon River, Brazil.
- Leptochloa langloisii* Vasey, Torrey Bot. Club Bul. 12: 7. 1885. Louisiana, Langlois.
- Leptochloa liebmanni* Fourn., Mex. Pl. 2: 147. 1886. Antigua, Mexico, Liebmann 244, 248.

- (8) *Leptochloa uninervia* (Presl) Hitchc. and Chase, U. S. Natl. Herb. Contrib. 18: 383. 1917. Based on *Megastachya uninervia* Presl.
Megastachya uninervia Presl, Rel. Haenk. 1: 283. 1830. Mexico, *Haenke*.
Poa uninervia Kunth, Rév. Gram. 1: Sup. XXVIII. 1830. Based on *Megastachya uninervia* Presl.
Diplachne verticillata Nees and Mey., Nov. Act. Acad. Caes. Leop. Carol. 19: Sup. 1: 27. 1841; 159. 1843. Chile and Peru, *Meyen*.
Uralespis verticillata Steud., Syn. Pl. Glum. 1: 248. 1854. Based on *Diplachne verticillata* Nees and Mey.
Eragrostis uninervia Steud., Syn. Pl. Glum. 1: 278. 1854. Based on *Megastachya uninervia* Presl.
Atropis carinata Griseb., Abh. Ges. Wiss. Göttingen 24: 291. 1879. Argentina.
Leptochloa imbricata Thurb. in S. Wats., Bot. Calif. 2: 293. 1880. California, Larken's Station, San Diego County, *Palmer* 404; Fort Yuma, *Thomas*; Gila Valley to Rio Grande.
Diplachne imbricata Scribn., Torrey Bot. Club Bul. 10: 30. 1883. Based on *Leptochloa imbricata* Thurb.
Brizopyrum uninervium Fourn., Mex. Pl. 2: 121. 1886. Based on *Megastachya uninervia* Presl.
Leptochloa virletii Fourn., Mex. Pl. 2: 147. 1886. San Luis Potosí, Mexico, *Virlet* 1404.
Diplachne tarapacana Phil., An. Mus. Nac. Chile. Bot. 8: 88. 1891. Tarapacá, Chile.
Rabdochloa imbricata Kuntze, Rev. Gen. Pl. 2: 788. 1891. Based on *Leptochloa imbricata* Thurb.
Diplachne carinata Hack., Bol. Acad. Cienc. Córdoba 16: 253. 1900. Based on *Atropis carinata* Griseb.
Diplachne uninervia Parodi, Univ. Nac. Buenos Aires Rev. Céntr. Estud. 18: 147. 1925. Based on *Megastachya uninervia* Presl.
- (3) *Leptochloa virgata* (L.) Beauv., Ess. Agrost. 71, 161, 166. pl. 15. f. 1. 1812. Based on *Eleusine virgata* Pers., which is based on *Cynosurus virgatus* L.
Cynosurus virgatus L., Syst. Nat. ed. 10. 2: 876. 1759. Jamaica.
Festuca virgata Lam., Tabl. Encycl. 1: 189. 1791. Based on *Cynosurus virgatus* L.
Eleusine virgata Pers., Syn. Pl. 1: 87. 1805. Based on *Cynosurus virgatus* L.
Chloris poaeformis H. B. K., Nov. Gen. et Sp. 1: 169. 1816. Colombia and Ecuador, *Humboldt* and *Bonpland*.
Leptostachys virgata G. Meyer, Prim. Fl. Esseq. 74. 1818. Based on *Cynosurus virgatus* Willd. [error for L].
Cynodon virgatus Raspail, Ann. Sci. Nat., Bot. 5: 302. 1825. Based on *Leptochloa virgata* Beauv.
Eleusine unioides Willd. ex Steud., Nom. Bot. ed. 2. 1: 549. 1840, as synonym of *Leptochloa virgata* Pers.
Leptochloa mutica Steud., Syn. Pl. Glum. 1: 208. 1854. Surinam [Dutch Guiana], *Kappler* 1553.
Leptochloa virgata var. *mutica* Doell in Mart., Fl. Bras. 2³: 91. 1878. Based on *L. mutica* Steud.
Leptochloa virgata var. *aristata* Fourn., Mex. Pl. 2: 146. 1886. Mexico.
Leptochloa virgata var. *intermedia* Fourn., Mex. Pl. 2: 146. 1886. Mexico, *Liebmänn* 243, 251.
Oxydenia virgata Nutt. ex Jacks., Ind. Kew. 2: 392. 1894, as synonym of *Leptochloa virgata*.
Leptochloa perennis Hack., Inf. Est. Centr. Agron. Cuba 1: 411. 1906. Cuba, *Baker* 4617.
- (6) *Leptochloa viscida* (Scribn.) Beal, Grasses N. Amer. 2: 434. 1896. Based on *Diplachne viscida* Scribn.
Diplachne viscida Scribn., Torrey Bot. Club Bul. 10: 30. 1883. Santa Cruz Valley, Tucson, Ariz., *Pringle* in 1881.

(130) LEPTOLOMA Chase

- (2) *Leptoloma arenicola* Swallen, Tex. Res. Found. Contrib. 1: 1. 1950. Kennedy County, Tex., *Swallen*.
- (1) *Leptoloma cognatum* (Schult.) Chase, Biol. Soc. Wash. Proc. 19: 192. 1906. Based on *Panicum cognatum* Schult.
Panicum nudum Walt., Fl. Carol. 73. 1788. South Carolina. Description inadequate, no specimen in the Walter Herbarium in the British Museum.
Panicum divergens Muhl. ex Ell., Bot. S. C. and Ga. 1: 130. 1816. Not *P. divergens* H. B. K., 1815. South Carolina. Name only, Muhl., Cat. Pl. 9. 1813.
Panicum cognatum Schult., Mantissa 2: 235. 1824. Based on *P. divergens* Muhl.
Panicum autumnale Bosc. ex Spreng., Syst. Veg. 1: 320. 1825. Origin unknown.
Panicum fragile Kunth, Rév. Gram. 1: 36. 1829. Based on *P. divergens* Muhl.
Panicum autumnale var. *pubiflorum* Vasey ex L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 508. 1894. Texas.
Digitaria cognata Pilger in Engl. and Prantl, Pflanzenfam. ed. 2. 14e: 50. 1940. Based on *Panicum cognatum* Schult.

(75) LIMNODEA L. H. Dewey

- (1) *Limnodea arkansana* (Nutt.) L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 518. 1894. Based on *Greenia arkansana* Nutt.

Greenia arkansana Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 142. 1837. Red River, Ark.

Sclerachne arkansana Torr. ex Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 274. 1841. Based on *Greenia arkansana* Nutt.

Sclerachne pilosa Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 275. 1841. Texas, Drummond.

Limnas arkansana Trin. ex Steud., Nom. Bot. ed. 2. 2: 45. 1841. Based on *Greenia arkansana* Nutt.

Stipa demissa Steud., Syn. Pl. Glum. 1: 130. 1854. New Orleans, La., Drummond 465.

Muhlenbergia hirtula Steud., Syn. Pl. Glum. 1: 180. 1854. Texas, Drummond.

Limnas pilosa Steud., Syn. Pl. Glum. 1: 421. 1854. Based on *Sclerachne pilosa* Trin.

Thurberia arkansana Benth. ex Vasey, U. S. Dept. Agr. Spec. Rpt. 63: 16. 1883. Based on *Greenia arkansana* Nutt.

Thurberia pilosa Vasey, U. S. Dept. Agr. Spec. Rpt. 63: 16. 1883. Based on *Sclerachne pilosa* Trin.

Limnodea arkansana pilosa Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 7 (ed. 3): 139. 1900. Based on *Sclerachne pilosa* Trin.

(50) *LOLIUM L.*

(2) *Lolium multiflorum* Lam., Fl. Franç. 3: 621. 1778. France.

Lolium scabrum Presl, Rel. Haenk. 1: 267. 1830. Peru, Haenke.

Lolium italicum A. Br., Flora 17: 241. 1834. Europe.

Lolium perenne var. *italicum* Parnell, Grasses Scotl. 1¹: 142. pl. 65. 1842.

Presumably based on *L. italicum* A. Br.

Lolium perenne var. *multiflorum* Parnell, Grasses Brit. 302. pl. 140. 1845. Presumably based on *L. multiflorum* Lam.

Lolium multiflorum forma *microstachyum* Uechtritz, Jahresb. Schles. Ges. Vaterl. Cult. 1876: 334. 1880. Germany.

Lolium temulentum var. *multiflorum* Kuntze, Rev. Gen. Pl. 2: 779. 1891. Based on *L. multiflorum* Lam.

Lolium multiflorum var. *italicum* Beck., Wiss. Mitt. Bosn. Herzeg. 9: 459. 1904. Based on *L. italicum* A. Br.

Lolium multiflorum var. *diminutum* Mutel, as used by Harger et al. (Conn. State Geol. Nat. Hist. Survey Bul. 48: 25. 1930) appears to be *L. multiflorum*. Mutel's variety, described from France, is uncertain.

LOLIUM MULTIFLORUM var. *RAMOSUM* Guss. ex Arcang. Comp. Fl. Ital. 799. 1882. Sicily and Corsica.

(1) *Lolium perenne* L., Sp. Pl. 83. 1753. Europe.

Lolium brasilianum Nees, Agrost. Bras. 443. 1829. Montevideo, Sellow.

Lolium canadense Bernh. in Rouv., Monogr. Lolium 27. 1853. Not *L. canadense* Michx., 1817. As synonym of *L. perenne* L.

Lolium perenne var. *pacyi* Sturtev., N. Y. State Agr. Expt. Sta. Rpt. 1882¹: 77. 1883. Name only, Experiment Station, Geneva, N. Y.

LOLIUM PERENNE var. *CRISTATUM* Pers., Syn. Pl. 1: 110. 1805. Europe.

(4) *Lolium persicum* Boiss. and Hohen. in Boiss., Diagn. Pl. Orient. Nov. I. 2¹³: 66. 1853. Northern Persia, Kotschy 278.

Lolium remotum Schrank, Baier. Fl. 1: 382. 1789 (description inadequate); Schrank ex Hoffm., Deutschl. Fl. ed. 2. 1: 63. 1800. Germany.

Lolium strictum Presl, Cyp. Gram. Sicul. 49. 1820. Sicily.

(5) *Lolium subulatum* Vis. Fl. Dalm. 1: 90. pl. 3. 1842. Europe.

(3) *Lolium temulentum* L., Sp. Pl. 83. 1753. Europe.

Craepalia temulenta Schrank, Baier. Fl. 1: 382. 1789. Based on *Lolium temulentum* L.

LOLIUM TEMULENTUM var. *LEPTOCHAETON* A. Br., Flora 1: 252. 1834. Germany.

Lolium arvense With., Bot. Arr. Veg. Brit. ed. 3. 2: 168. 1796. Great Britain.

Lolium temulentum var. *arvense* Bab., Man. Brit. Bot. 377. 1843. Based on *L. arvense* With.

(123) *LUZIOLA Juss.*

(2) *Luziola bahiensis* (Steud.) Hitchc., U. S. Natl. Herb. Contrib. 12: 234. 1909. Based on *Caryochloa bahiensis* Steud.

Caryochloa bahiensis Steud., Syn. Pl. Glum. 1: 5. 1854. Bahia, Brazil.

Luziola alabamensis Chapm., Fl. South. U. S. 584. 1860. Brooklyn, Conecuh County, Ala., Beaumont.

Luziola longivalvula Doell in Mart., Fl. Bras. 2²: 17. 1871. Bahia, Brazil, Salzmann [type]; Minas Geraes, Widgren, Regnell III. 1376. (Misspelled *longivalvula* but correct in index.)

Luziola striata Bal. and Poitr., Soc. Hist. Nat. Toulouse Bul. 12: 231. pl. 4. f. 2. 1878. Paraguay, Balansa 181.

Luziola pusilla S. Moore, Linn. Soc. Bot. Trans. II. 4: 507. pl. 37. f. 1-8. 1895. Santa Cruz, Mato Grosso, Brazil, Moore 760.

Luziola bahiensis var. *alabamensis* Prodoehl, Bot. Archiv Mez 1: 242. 1922. Based on *Luziola alabamensis* Chapm.

- (1) *Luziola peruviana* Gmel., Syst. Nat. 2: 637. 1791. Based on a species described but not named by Jussieu, Gen. Pl. 33. 1789. Peru, *Dombey*.

(78) **LYCURUS H. B. K.**

- (1) *Lycurus phleoides* H. B. K., Nov. Gen. et Sp. 1: 142. pl. 45. 1815. Mexico, *Humboldt and Bonpland*.
Pleopogon setosum Nutt., Acad. Nat. Sci. Phila. Jour. II. 1: 189. 1848. Santa Fe, N. Mex., *Gambel*.
Lycurus phleoides var. *glaucofolius* Beal, Grasses N. Amer. 2: 271. 1896. Mexico, *Pringle* 426; Texas, *Havard*, *Nealley*.

(163) **MANISURIS L.**

- (1) *Manisuris altissima* (Poir.) Hitchc., Wash. Acad. Sci. Jour. 24: 292. 1934. Based on *Rottboellia altissima* Poir.
Rottboellia altissima Poir., Voy. Barb. 2: 105. 1789. North Africa.
Rottboellia fasciculata Lam., Tabl. Encycl. 1: 204. 1791. North Africa.
Hemarthria fasciculata Kunth, Rév. Gram. 1: 153. 1829. Based on *Rottboellia fasciculata* Lam.
Rottboellia compressa var. *fasciculata* Hack. in DC., Monogr. Phan. 6: 286. 1889. Based on *R. fasciculata* Lam.
Manisuris fasciculata Hitchc., Amer. Jour. Bot. 2: 299. 1915. Based on *Rottboellia fasciculata* Lam.
- (2) *Manisuris cylindrica* (Michx.) Kuntze, Rev. Gen. Pl. 2: 779. 1891. Based on *Tripsacum cylindricum* Michx.
Ischaemum scariosum Walt., Fl. Carol. 249. 1788. South Carolina.
Tripsacum cylindricum Michx., Fl. Bor. Amer. 1: 60. 1803. Florida, *Michaux*.
Rottboellia campestris Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 151. 1837. Arkansas [*Nuttall*].
Rottboellia cylindrica Torr., U. S. Expl. Miss. Pacif. Rpt. 4: 159. 1857. Not *R. cylindrica* Willd., 1797. Based on *Tripsacum cylindricum* Michx.
Coelorachis cylindrica Nash, N. Amer. Fl. 17: 85. 1909. Based on *Tripsacum cylindricum* Michx.
Manisuris campestris Hitchc. in Small, Man. Southeast. Fl. 41. 1933. Based on *Rottboellia campestris* Nutt.
- (4) *Manisuris rugosa* (Nutt.) Kuntze, Rev. Gen. Pl. 2: 780. 1891. Based on *Rottboellia rugosa* Nutt.
Rottboellia rugosa Nutt., Gen. Pl. 1: 84. 1818. Florida, *Baldwin*.
Rottboellia corrugata Baldw., Amer. Jour. Sci. 1: 355. 1819. Camden County, Ga., *Baldwin*.
Hemarthria rugosa Kunth, Rév. Gram. 1: 153. 1829. Based on *Rottboellia rugosa* Nutt.

Rottboellia rugosa var. *chapmani* Hack. in DC., Monogr. Phan. 6: 308. 1889. Florida, *Chapman*.

Manisuris corrugata Kuntze, Rev. Gen. Pl. 2: 779. 1891. Based on *Rottboellia corrugata* Baldw.

Manisuris rugosa var. *chapmani* Scribn., Torrey Bot. Club Mem. 5: 28. 1894. Based on *Rottboellia rugosa* var. *chapmani* Hack.

Manisuris chapmani Nash in Small, Fl. Southeast. U. S. 56. 1903. Based on *Rottboellia rugosa* var. *chapmani* Hack.
Coelorachis rugosa Nash, N. Amer. Fl. 17: 86. 1909. Based on *Rottboellia rugosa* Nutt.

Coelorachis corrugata A. Camus, Ann. Soc. Linn. Lyon 68: 197. 1921. Based on *Rottboellia corrugata* Baldw.

- (3) *Manisuris tessellata* (Steud.) Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 20: 20. f. 9. 1900. Based on *Rottboellia tessellata* Steud.

Rottboellia tessellata Steud., Syn. Pl. Glum. 1: 362. 1854. Louisiana, *Riehl* 60.

Rottboellia corrugata var. *areolata* Hack. in DC., Monogr. Phan. 6: 309. 1889. Mobile, Ala., *Mohr* in 1884.

Manisuris corrugata var. *areolata* Mohr, Torrey Bot. Club Bul. 24: 21. 1897. Based on *Rottboellia corrugata* var. *areolata* Hack.

Manisuris tessellata var. *areolata* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 17 (ed. 2): 9. 1901. Presumably based on *Rottboellia corrugata* var. *areolata* Hack.

Coelorachis tessellata Nash, N. Amer. Fl. 17: 86. 1909. Based on *Rottboellia tessellata* Steud.

- (5) *Manisuris tuberculosa* Nash, N. Y. Bot. Gard. Bul. 1: 430. 1900. Eustis, Fla., *Nash* 1074.

Coelorachis tuberculosa Nash, N. Amer. Fl. 17: 86. 1909. Based on *Manisuris tuberculosa* Nash.

Rottboellia tuberculosa Hitchc., Biol. Soc. Wash. Proc. 41: 163. 1928. Based on *Manisuris tuberculosa* Nash.

(30) **MELICA L.**

Melica altissima L., Sp. Pl. 66. 1753. Siberia.

- (2) *Melica aristata* Thurb. ex Boland., Calif. Acad. Sci. Proc. 4: 103. 1870. "Number 4861 [*Bolander*] Catalogue, 1867," Clarks (now Wawona) [type]; Yosemite Valley; Shady Canyon to Summit; Bear Valley to Eureka, Calif.
Bromelica aristata Farwell, Rhodora 21: 77. 1919. Based on *Melica aristata* Thurb.

- (7) *Melica bulbosa* Geyer, ex Port. and Coult., Syn. Fl. Colo. 149. 1874. Porter

and Coulter cite Gray, Amer. Acad. Sci. Proc. 8: 409. 1872. Gray gives no description but cites *M. bulbosa* Geyer, Jour. Bot. Kew Misc. (Pl. Geyer.) 8: 19. 1856. In the latter work "Geyer no. 11, Upper Platte," is listed without description. The description by Porter and Coulter applies to this collection as represented in the Gray Herbarium.

Melica bella Piper, U. S. Dept. Agr., Div. Agrost. Cir. 27: 10. 1900. Upper Platte, Geyer [11]. A new name for "*M. bulbosa* Geyer, in U. S. Dept. Agr., Div. Bot. Bul. 13: 63. pl. 63. 1893, not *M. bulbosa* Geyer, in Thurb., in S. Wats., Bot. Calif. 2: 304. 1880," the description by Porter and Coulter having been overlooked. The Thurber publication refers to *M. californica* (No. 18 of this work).

Melica bella subsp. *intonsa* Piper, U. S. Natl. Herb. Contrib. 11: 128. 1906. Wenas, Wash., Griffiths and Cotton 103.

Melica bulbosa var. *typica* Cronquist, Madroño 7: 77. 1943. Based on *M. bulbosa* Geyer.

Melica bulbosa var. *caespitosa* Cronquist, Madroño 7: 77. 1943. West side of Alturas Lake, Blaine County, Idaho, Cronquist and Cronquist 2603.

- (18) *Melica californica* Scribn., Acad. Nat. Sci. Phila. Proc. 1885: 46. pl. 1. f. 6. 1885. Based on *M. poaeoides* as described by Torrey in Pacific Railroad Report (see below), the specimen cited by Torrey, in N. Y. Bot. Gard., being named "*M. californica* Scribn." in Scribner's script.

Melica poaeoides Nutt. [misapplied by] Torr., U. S. Rpt. Expl. Miss. Pacif. 4: 157. 1857. Not *M. poaeoides* Nutt., 1848. Corte Madera, Calif., [Bigelow].

Melica bulbosa Geyer ex Thurb. in S. Wats., Bot. Calif. 2: 304. 1880. Not *M. bulbosa* Geyer ex Port. and Coult., 1874. Santa Inez, Calif., Brewer 569.

Melica longiligula Scribn. and Kearns, U. S. Dept. Agr., Div. Agrost. Bul. 17: 225. f. 521. 1899. Southern California, Parish Brothers 865.

MELICA CALIFORNICA var. *NEVADENSIS* Boyle, Madroño 8: 17. 1945. Calaveras County, Calif., Rutter 163.

Melica ciliata L., Sp. Pl. 66. 1753. Europe.

- (17) *Melica frutescens* Scribn., Acad. Nat. Sci. Phila. Proc. 1885: 45. pl. 1. f. 15, 16. 1885. Southern California, Parry and Lemmon 401 [type, labeled by Scribner].

- (8) *Melica fugax* Boland., Calif. Acad. Proc. 4: 104. 1870. Donner Lake, Calif. [Bolander and Kellogg].

Melica geyeri [Munro misapplied by] Thurb. in Wilkes, U. S. Expl. Exped. Bot. 17: 492. 1874. Cascade Mountains, Oreg.

Melica fugax subsp. *madophylla* Piper, U. S. Natl. Herb. Contrib. 11: 128. 1906. Falcon Valley, Wash., Suksdorf 61.

Melica macbridei Rowland in Nels., Bot. Gaz. 54: 404. 1912. Silver City, Idaho, Macbride 948.

Melica fugax var. *inexpansa* Suksdorf, Werdenda 1²: 1. 1923. Falcon Valley, Wash., Suksdorf 6989.

Melica fugax var. *macbridei* Beetle, West. Bot. Leaflets 4: 286. 1946. Based on *M. macbridei* Rowland.

- (5) *Melica geyeri* Munro in Boland., Calif. Acad. Sci. Proc. 4: 103. 1870. [Ukiah] Calif., Bolander 7, the specimen examined by Munro (in U. S. Natl. Herb.). The same collection was later distributed as 6119.

Glyceria bulbosa Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 95. 1862. Columbia woods, Nuttall.

Bromus muticus Nutt. ex A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 335. 1862, as synonym of *Glyceria bulbosa* Buckl.

Melica poaeoides var. *bromoides* Boland., Calif. Acad. Sci. Proc. 4: 103. 1870, as synonym of *M. geyeri* Munro. Bolander 40 and 6119.

Melica bromoides Boland. ex A. Gray, Amer. Acad. Sci. Proc. 8: 409. 1872. Based on *M. poaeoides* var. *bromoides* Boland. [Bolander 6119].

Melica poaeoides Boland. ex Scribn., Acad. Nat. Sci. Phila. Proc. 1885: 47. 1885, as synonym of "*M. bromoides* Gray."

Melica bromoides var. *howellii* Scribn., Acad. Nat. Sci. Phila. Proc. 1885: 47. 1885. Near Waldo, Oreg., Howell 335 in 1884.

Melica pammeli Scribn., Davenport Acad. Sci. Proc. 7: 240. 1899. Geranium Park, Wyo., Pammel 159.

Bromelica geyeri Farwell, Rhodora 21: 78. 1919. Based on *Melica geyeri* Munro.

Bromelica geyeri var. *howellii* Farwell, Rhodora 21: 78. 1919. Based on *Melica bromoides* var. *howellii* Scribn.

MELICA GEYERI var. *ARISTULATA* J. T. Howell, West. Bot. Leaflets 4: 245. 1946. Marin County, Calif., J. T. Howell 17906.

- (3) *Melica harfordii* Boland., Calif. Acad. Sci. Proc. 4: 102. 1870. Santa Cruz, Bolander 53 [type]; Redwood, Bolander 6464; Yosemite Valley and Bear Valley, both Bolander.

Melica harfordii var. *minor* Vasey, Torrey Bot. Club Bul. 15: 48. 1888. Siskiyou Mountains, Oreg., Howell in 1887.

Melica harfordii tenuior Piper, U. S. Natl. Herb. Contrib. 11: 127. 1906. Based on *M. harfordii* var. *minor* Vasey.

Bromelica harfordii Farwell, Rhodora 21:

78. 1919. Based on *Melica harfordii* Boland.
Bromelica harfordii var. *minor* Farwell, *Rhodora* 21: 78. 1919. Based on *Melica harfordii* var. *minor* Vasey.
Melica harfordii var. *tenuis* Suksdorf, *Werdenda* 1: 17. 1927. Bingen, Wash., *Suksdorf* 12018.
Melica harfordii var. *viridifolia* Suksdorf, *Werdenda* 1: 17. 1927. Bingen, Wash., *Suksdorf* 11686, 11777.
- (16) **Melica imperfecta** Trin., *Acad. St. Pétersb. Mém. VI. Sci. Nat.* 2¹: 59. 1836. California.
Melica colpodoides Nees, *Ann. Nat. Hist.* 1: 283. 1838. California, *Douglas*.
Melica panicoides Nutt., *Acad. Nat. Sci. Phila. Jour. II.* 1: 188. 1848. Santa Barbara, Calif., *Gambel*.
Melica poaeoides Nutt., *Acad. Nat. Sci. Phila. Jour. II.* 1: 188. 1848. Santa Catalina Island, Calif., *Gambel*. [The type at the British Museum is labeled San Diego.]
Melica parishii Vasey ex Beal, *Grasses N. Amer.* 2: 500. 1896. Southern California, *Parish* 1997.
Melica imperfecta var. *pubens* Scribn., *U. S. Dept. Agr., Div. Agrost. Cir.* 30: 8. 1901. Santa Cruz Island, Calif., *Bran-degee* 64.
- The name is erroneously given as *Melica imperforata* Nees in Hook. and Arn., *Bot. Beechey Voy.* 403. 1840. This is the species described and figured by Vasey (*U. S. Dept. Agr., Div. Bot. Bul.* 13²: pl. 84. 1893) as *Poa thurberiana* Vasey, but the name is based on *Panicularia thurberiana* Kuntze.
- MELICA IMPERFECTA var. FLEXUOSA Boland., *Calif. Acad. Sci. Proc.* 4: 101. 1870. "Mariposa to Clark's" [Yosemite Valley region], Calif., *Bolander* in 1866.
- MELICA IMPERFECTA var. MINOR Scribn., *Acad. Nat. Sci. Phila. Proc.* 1885: 42. 1885. San Bernardino Mountains, *Parish Brothers* 856.
- MELICA IMPERFECTA var. REFRACTA Thurb. in *S. Wats., Bot. Calif.* 2: 303. 1880. San Bernardino, Calif., *Lemmon*.
- (9) **Melica inflata** (Boland.) Vasey, *U. S. Natl. Herb. Contrib.* 1: 269. 1893. Based on *M. poaeoides* var. *inflata* Boland.
Melica poaeoides var. *inflata* Boland., *Calif. Acad. Sci. Proc.* 4: 101. 1870. Yosemite Valley, Calif., *Bolander* 6121.
Melica bulbosa var. *inflata* Boyle, *Madroño* 8: 19. 1945. Based on *M. poaeoides* var. *inflata* Boland.
- (14) **Melica montezumae** Piper, *Biol. Soc. Wash. Proc.* 18: 144. 1905. Chihuahua, Mex., *Pringle* 430.
Melica alba Hitchc., *U. S. Natl. Herb. Contrib.* 17: 367. 1913. Chihuahua, Mex., *Pringle* 430.
- (12) **Melica mutica** Walt., *Fl. Carol.* 78. 1788. South Carolina.
Melica glabra Michx., *Fl. Bor. Amer.* 1: 62. 1803. Virginia to Florida, *Michaux*.
Melica rariflora Schreb., *Beschr. Gräs.* 2: 157. 1810. Based on *M. glabra* Michx.
Melica diffusa Pursh, *Fl. Amer. Sept.* 1: 77. 1814. Virginia and Carolina.
Melica speciosa Muhl., *Descr. Gram.* 87. 1817. Pennsylvania.
Melica racemosa Muhl., *Descr. Gram.* 88. 1817. Not *M. racemosa* Thunb., 1794. Carolina; Georgia. Name only, Muhl., *Cat. Pl.* 11. 1813.
Melica muhlenbergiana Schult., *Mantissa* 2: 294. 1824. Based on *M. racemosa* Muhl.
Melica mutica var. *glabra* A. Gray, *Man. ed.* 5. 626. 1867. Based on *M. glabra* Pursh (error for Michx.).
Melica mutica var. *diffusa* A. Gray, *Man. ed.* 5. 626. 1867. Based on *M. diffusa* Pursh.
Melica mutica forma *diffusa* Fernald, *Rhodora* 41: 501. 1939. Based on *M. diffusa* Pursh.
- (13) **Melica nitens** (Scribn.) Nutt. ex Piper, *Torrey Bot. Club Bul.* 32: 387. 1905. Based on *M. diffusa* var. *nitens* Scribn.
Melica scabra Nutt., *Amer. Phil. Soc. Trans. (n.s.)* 5: 148. 1837. Not *M. scabra* H. B. K., 1816. Fort Smith, Ark., *Nuttall*.
Melica diffusa var. *nitens* Scribn., *Acad. Nat. Sci. Phila. Proc.* 1885: 44. 1885. Arkansas, *Nuttall*. [The type in the Academy of Natural Sciences, Philadelphia, is labeled *M. nitens* Nutt.]
Melica nitens Nutt. ex Scribn., *Acad. Nat. Sci. Phila. Proc.* 1885: 44. 1885, as synonym of *M. diffusa* var. *nitens*.
- (11) **Melica porteri** Scribn., *Acad. Nat. Sci. Phila. Proc.* 1885: 44. pl. 1. f. 17, 18. 1885. Based on *M. mutica* var. *parviflora* Porter.
Melica mutica var. *parviflora* Porter in *Port. and Coult., Syn. Fl. Colo.* 149. 1874. Glen Eyrie, Colo., *Porter* [type], *Meehan*; Sierra Madre Range, *Coulter*.
Melica parviflora Scribn., *Torrey Bot. Club Mem.* 5: 50. 1894. Based on *M. mutica* var. *parviflora* Porter.
- MELICA PORTERI var. LAXA Boyle, *Madroño* 8: 25. 1945. White Mountains, N. Mex., *Wooton* 680.
- (1) **Melica smithii** (Porter) Vasey, *Torrey Bot. Club Bul.* 15: 294. 1888. Based on *Avena smithii* Porter.
Avena smithii Porter ex A. Gray, *Man. ed.* 5. 640. 1867. Sault Sainte Marie, Mich., *C. E. Smith*.
Melica retrofracta Suksdorf, *Deut. Bot. Monatschr.* 19: 92. 1901. Skamania County, Wash. [*Suksdorf* 2334].
Bromelica smithii Farwell, *Rhodora* 21: 77. 1919. Based on *Avena smithii* Porter.
Schizachne smithii Wiegand ex Muenscher, *Fl. Whatcom County, Washington* 66.

1941. Presumably based on *Avena smithii* Porter.
- (6) *Melica spectabilis* Scribn., Acad. Nat. Sci. Phila. Proc. 1885: 45. pl. 1. f. 11, 12, 13. 1885. Montana, Crow Mountains, Scribner 385 [type]; Boseman Pass, Canby 368. Colorado, Porter in 1872. Yellowstone Park, Parry 295. Nevada (erroneously given as Utah), Watson 1303. Idaho, Watson 455. The synonyms cited by Scribner are erroneous, "*M. bulbosa* S. Wats., Bot. King Exp. 383" being an error for *M. poaeoides* Nutt., Bot. King Exp. 383; "Porter and Coulter Fl. Colorado 149." refers to the valid *M. bulbosa*.
- Melica scabrata* Scribn. in Piper, Fl. Palouse 25. 1901. Pullman, Wash., Piper 1745.
- (10) *Melica stricta* Boland., Calif. Acad. Sci. Proc. 3: 4. 1863. Silver City, Nev., Dunn.
- Melica stricta* var. *albicaulis* Boyle, Madroño 8: 24. 1945. San Antonio Mountains, Calif., I. M. Johnston 1516.
- (4) *Melica subulata* (Griseb.) Scribn., Acad. Nat. Sci. Phila. Proc. 1885: 47. 1885. Based on *Bromus subulatus* Griseb.
- Bromus subulatus* Griseb. in Ledeb., Fl. Ross. 4: 358. 1853. Unalaska, Eschscholtz.
- Melica acuminata* Boland, Calif. Acad. Sci. Proc. 4: 104. 1870. Mendocino County, Calif., Bolander 4698.
- Festuca acerosa* Trin. ex A. Gray, Amer. Acad. Sci. Proc. 8: 410. 1872, as synonym of *Bromus subulatus* Griseb.
- Melica poaeoides* var. *acuminata* Boland. ex Scribn., Acad. Nat. Sci. Phila. Proc. 1885: 47. 1885, as synonym of *M. subulata* Scribn. California, Bolander 4698.
- Bromelica subulata* Farwell, Rhodora 21: 78. 1919. The name is based on *Festuca subulata* Bong., doubtless an error for *Bromus subulatus* Griseb., since *Melica acuminata* Boland is also cited.
- This is the species to which Scribner (U.S. Dept. Agr., Div. Agrost. Cir. 30: 8. 1901.) applied the name *Melica cepacea* Scribn., based on *Festuca cepacea* Phil., a Chilean species of *Melica*.
- (15) *Melica torreyana* Scribn., Acad. Nat. Sci. Phila. Proc. 1885: 43. pl. 1. f. 3, 4. 1885. California, Bigelow in 1853-4.
- Melica imperfecta* var. *sesquiflora* Torr. ex Scribn., Acad. Nat. Sci. Phila. Proc. 1885: 43. 1885, as synonym of *M. torreyana*, a herbarium name given to a specimen collected by Bigelow in California in 1853-4.
- Tristegis glutinosa* Nees, Horae Phys. Berol. 47, 54. pl. 7. 1820. Brazil.
- Panicum minutiflorum* Raspail, Ann. Sci. Nat., Bot. 5: 299. 1825. Based on *Melinis minutiflora* Beauv.
- Panicum melinis* Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 1: 291. 1834. Based on *Melinis minutiflora* Beauv.
- Muhlenbergia brasiliensis* Steud., Syn. Pl. Glum. 1: 177. 1854. Bahia, Brazil, Salzmann [652].
- Agrostis polypogon* Salzm. ex Steud., Syn. Pl. Glum. 1: 177. 1854, as synonym of *Muhlenbergia brasiliensis*.
- Mibora minima** (L.) Desv., Obs. Angers 45. 1818. Based on *Agrostis minima* L.
- Agrostis minima* L., Sp. Pl. 63. 1753. France.

(102) MICROCHLOA R. Br.

- (1) *Microchloa kunthii* Desv., Opusc. 75. 1831. Mexico, Humboldt and Bonpland.
- Paspalum tenuissimum* Jones, West. Bot. Contrib. 18: 24. 1935. Baja California, Jones 27584.

(152) MICROSTEGIUM Nees

- (1) *Microstegium vimineum* (Trin.) A. Camus, Ann. Soc. Linn. Lyon 68: 201. 1921. Based on *Andropogon vimineus* Trin.
- Andropogon vimineus* Trin., Acad. St. Pétersb. Mém. VI. Math. Phys. Nat. 2: 268. 1832. Nepal.
- Microstegium willdenovianum* Nees in Lindl., Nat. Syst. Bot. (ed. 2 of his Introd. Bot.) 447. 1836. Nepal.
- Pollinia willdenoviana* Benth., Linn. Soc. Jour., Bot. 19: 67. 1881. Based on *Microstegium willdenovianum* Nees.
- Pollinia imberbis* var. *willdenoviana* Hack. in DC., Monogr. Phan. 6: 178. 1889. Based on *Microstegium willdenovianum* Nees.
- Eulalia viminea* Kuntze, Rev. Gen. Pl. 2: 775. 1891. Based on *Andropogon vimineus* Trin.
- Pollinia viminea* Merr., Enum. Philipp. Pl. 1: 35. 1922. Based on *Andropogon vimineus* Trin.
- MICROSTEGIUM VIMINEUM** var. **IMBERBE** (Nees) Honda, Tokyo Univ. Facult. Sci. Jour. Sec. 3. Bot. 3: 408. 1930. Based on *Pollinia imberbis* Nees.
- Pollinia imberbis* Nees in Steud., Syn. Pl. Glum. 1: 410. 1855. Nepal.
- Eulalia viminea* var. *variabilis* Kuntze, Rev. Gen. Pl. 2: 775. 1891. Sikkim.

(126) MELINIS Beauv.

- (1) *Melinis minutiflora* Beauv., Ess. Agrost. 54. pl. 11. f. 4. 1812. Rio de Janeiro, Brazil.

(88) MILIUM L.

- (1) *Milium effusum* L., Sp. Pl. 61. 1753. Europe.
- Miliarium effusum* Moench, Meth. Pl.

204. 1794. Based on *Milium effusum* L.

Melica effusa Salisb., Prodr. Stirp. 20. 1796. Based on *Milium effusum* L.

Decandolia effusa Bast., Fl. Maine-et-Loire 28. 1808. Based on *Milium effusum* L.

Paspalum effusum Raspail, Ann. Sci. Nat. Bot. 5: 301. 1825. Based on *Milium effusum* L.

(149) *MISCANTHUS* Anderss.

Miscanthus nepalensis (Trin.) Hack. in DC., Monogr. Phan. 6: 104. 1889. Based on *Eulalia nepalensis* Trin.

Eulalia nepalensis Trin., Acad. St. Pétersb. Mém. VI. Math. Phys. Nat. 2: 333. 1832. Nepal, India.

Miscanthus sacchariflorus (Maxim.) Hack. in Engl. and Prantl, Pflanzenfam. 2: 23, 102. 1887. Based on *Imperata sacchariflora* Maxim.

Imperata sacchariflora Maxim. (Prim. Fl. Amur. 331.) Acad. St. Pétersb. Sav. Étrang. Mém. 9: 331. 1859. East Siberia.

(1) *Miscanthus sinensis* Anderss., Öfv. Svensk. Vet. Akad. Förh. 12: 166. 1856. China.

Saccharum japonicum Thunb., Linn. Soc. Trans. 2: 328. 1794. Not *Miscanthus japonicus* Anderss., 1855. Japan.

Eulalia japonica Trin., Acad. St. Pétersb. Mém. VI. Math. Phys. Nat. 2: 333. 1832. Based on *Saccharum japonicum* Thunb.

Miscanthus sinensis var. *variegatus* Beal, Grasses N. Amer. 2: 25. 1896. Cultivated.

Miscanthus sinensis var. *zebrinus* Beal, Grasses N. Amer. 2: 25. 1896. Cultivated.

Xiphagrostis japonica Coville, U. S. Natl. Herb. Contrib. 9: 400. 1905. Based on *Saccharum japonicum* Thunb.

Miscanthus sinensis var. *gracillimus* Hitchc. in Bailey, Cycl. Amer. Hort. 1021. f. 1408. 1901. Cultivated under the garden name *Eulalia japonica* var. *gracillima*.

Eulalia japonica var. *gracillima* Grier, Amer. Midl. Nat. 11: 331. 1929. Based on *Miscanthus sinensis* var. *gracillimus* Hitchc.

(16) *MOLINIA* Schrank

(1) *Molinia caerulea* (L.) Moench, Meth. Pl. 183. 1794. Based on *Aira caerulea* L.

Aira caerulea L., Sp. Pl. 63. 1753. Europe.

Festuca caerulea Lam. and DC., Fl. Franç. ed. 3. 3: 46. 1805. Based on *Aira caerulea* L.

Enodium caeruleum Gaudin, Agrost. Helv.

1: 145. 1811. Based on *Aira caerulea* L.

Cynodon caeruleus Raspail, Ann. Sci. Nat., Bot. 5: 302. 1825. Based on *Molinia caerulea* Koel. (error for Moench).

Amblytes caerulea Dulac, Fl. Haut. Pyr. 80. 1867. Based on *Molinia caerulea* Moench.

(20) *MONANTHOCLOË* Engelm.

(1) *Monanthochloë littoralis* Engelm., St. Louis Acad. Sci. Trans. 1: 437. pl. 13. 14. 1859. Texas, *Drummond*, *Berlandier* 3227 (Matamoros region), Galveston Island, *Lindheimer*; Florida, Key West, *Blodgett*.

(51) *MONERMA* Beauv.

(1) *Monerma cylindrica* (Willd.) Coss. and Dur., Expl. Sci. Alger. 2: 214. 1855. Based on *Rottboellia cylindrica* Willd. *Rottboellia cylindrica* Willd., Sp. Pl. 1: 464. 1797. Europe.

Ophiurus cylindricus Beauv., Ess. Agrost. 116, 168, 176. 1812. Based on *Rottboellia cylindrica* Willd.

Monerma monandra Beauv., Ess. Agrost. 117, 168, 177. pl. 20. f. 10. 1812. "Rottboellia monandra Lin." (p. 117) and "R. monandra Roth" (p. 177) are referred to *Monandra monerma*, but neither Linnaeus nor Roth published the name. Pl. 10, fig. 9, and the generic description unquestionably indicate *Rottboellia cylindrica* Willd. No locality is cited for *M. monandra* Beauv.

Lepturus cylindricus Trin., Fund. Agrost. 123. 1820. Based on *Rottboellia cylindrica* Willd.

Lolium cylindricum Aschers. and Graebn., Syn. Mitteleur. Fl. 2: 761. 1902. Based on *Rottboellia cylindrica* Willd.

(82) *MUHLENBERGIA* Schreb.

(31) *Muhlenbergia andina* (Nutt.) Hitchc., U. S. Dept. Agr. Bul. 772: 145. 1920. Based on *Calamagrostis andina* Nutt.

Calamagrostis andina Nutt., Acad. Nat. Sci. Phila. Jour. II. 1: 187. 1848. California, on the Colorado of the West, *Gambel*.

Vaseya comata Thurb. in A. Gray, Acad. Nat. Sci. Phila. Proc. 1863: 79. 1863. Nebraska [probably Wyoming, *Hall* and *Harbour* 685].

Muhlenbergia comata Thurb. ex Benth., Linn. Soc. Jour., Bot. 19: 83. 1881. Based on *Vaseya comata* Thurb.

(8) *Muhlenbergia appressa* C. O. Goodding, Wash. Acad. Sci. Jour. 31: 504. 1941. Pinal or Gila County, Ariz., *Harrison* and *Kearney* 1493.

(26) *Muhlenbergia arenacea* (Buckl.) Hitchc., Biol. Soc. Wash. Proc. 41: 161.

1928. Based on *Sporobolus arenaceus* Buckl.
Sporobolus arenaceus Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 89. 1862. Western Texas [Wright 737].
Sporobolus asperifolius var. *brevifolius* Vasey, U. S. Natl. Herb. Contrib. 1: 56. 1890, name only, Pena, Duval County, Tex., Nealley; U. S. Natl. Herb. Contrib. 3: 64. 1892, as synonym of *S. auriculatus* Vasey.
Sporobolus auriculatus Vasey, Contrib. U. S. Natl. Herb. 3: 64. 1892. Pena, Tex., Nealley.
- (54) **Muhlenbergia arenicola** Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 91. 1862. Western Texas [Wright 735].
Podosaemum arenicola Bush, Amer. Midl. Nat. 7: 40. 1921. Based on *Muhlenbergia arenicola* Buckl.
- (52) **Muhlenbergia arizonica** Scribn., Torrey Bot. Club Bul. 15: 8. pl. 76. f. A. 1888. Near Mexican Boundary, Arizona, Pringle in 1884.
- (23) **Muhlenbergia arsenei** Hitchc., Biol. Soc. Wash. Proc. 41: 161. 1928. Sulphur Springs, N. Mex., Arsène and Benedict 16405.
- (27) **Muhlenbergia asperifolia** (Nees and Mey.) Parodi, Univ. Nac. Buenos Aires Rev. Agron. 6: 117. f. 1. 1928. Based on *Sporobolus asperifolius* Nees and Mey.
Vilfa asperifolia Meyen, Reis. Erd. 1: 408. 1834, name only; Nees and Mey., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 95. 1840. Chile, Meyen.
Sporobolus asperifolius Nees, Nov. Act. Acad. Caes. Leop. Carol. 19: Sup. 1: 9. 1841; 141. 1843. Based on *Vilfa asperifolia* Nees and Mey.
Agrostis distichophylla R. A. Phil., Fl. Atac. 54. 1860. Not *A. distichophylla* Roem. and Schult., 1817. Chile. (Fide Parodi.)
Sporobolus sarmentosus Griseb., Abhandl. Gesell. Wiss. Göttingen 24: 295. 1879. Argentina.
Sporobolus deserticolus Phil., An. Mus. Nac. Chile Bot. 8: 82. 1891. Chile. (Fide Parodi.)
Sporobolus asperifolius var. *major* Vasey, U. S. Natl. Herb. Contrib. 3: 64. 1892. [Marfa, Tex., Havard 10 in 1883.]
Sporobolus distichophyllus Phil., An. Univ. Chile 94: 7. 1896. Based on *Agrostis distichophylla* Phil.
Agrostis eremophila Speg., An. Mus. Nac. Buenos Aires 7: 190. 1902. Based on *A. distichophylla* Phil.
- (37) **Muhlenbergia brachyphylla** Bush, Amer. Midl. Nat. 6: 41. 1919. Webb City, Mo., Palmer 2734. (Not invalidated by *M. brachyphylla* Nees ex Jacks., Ind. Kew. 2: 269. 1894, a clerical error for *Podosaemum brachyphyllum* Nees.)
- (12) **Muhlenbergia brevis** C. O. Goodding, Wash. Acad. Sci. Jour. 31: 505. 1941. Socorro County, N. Mex., Metcalfe 671.
- (34) **Muhlenbergia californica** Vasey, Torrey Bot. Club Bul. 13: 53. 1886. Based on *M. glomerata* var. *brevifolia* Vasey.
Muhlenbergia glomerata var. *brevifolia* Vasey, Bot. Gaz. 7: 92. 1882. [San Bernardino Mountains], Calif., Parish [1028].
Muhlenbergia sylvatica var. *californica* Vasey, Bot. Gaz. 7: 93. 1882. San Bernardino Mountains, Calif., Parish [1076].
Muhlenbergia parishii Vasey, Torrey Bot. Club Bul. 13: 53. 1886. Based on *M. sylvatica* var. *californica* Vasey.
Muhlenbergia racemosa var. *brevifolia* Vasey ex Beal, Grasses N. Amer. 2: 253. 1896. Based on *M. glomerata* var. *brevifolia* Vasey.
Muhlenbergia californica Abrams, Fl. Los Angeles 32. 1904. Based on *M. sylvatica* var. *californica* Vasey.
- (62) **Muhlenbergia capillaris** (Lam.) Trin., Gram. Unifl. 191. 1824. Based on *Trichochloa capillaris* DC., this based on *Stipa capillaris* Lam.
Stipa diffusa Walt., Fl. Carol. 78. 1788. Not *Muhlenbergia diffusa* Willd., 1798. South Carolina.
Stipa capillaris Lam., Tabl. Encycl. 1: 158. 1791. Carolina, Fraser.
Podosaemum capillare Desv., Nouv. Bul. Soc. Philom. (Paris) 2: 188. 1810. Based on *Stipa capillaris* Lam.
Tosagris agrostidea Beauv., Ess. Agrost. 29. pl. 8. f. 3. 1812. United States.
Podosaemum agrostideum Beauv., Ess. Agrost. 176, 179. 1812. Based on *Tosagris agrostidea* Beauv.
Trichochloa capillaris DC., Cat. Hort. Monsp. 152. 1813. Based on *Stipa capillaris* Lam.
Trichochloa polypogon DC., Cat. Hort. Monsp. 152. 1813. Carolina, Fraser.
Muhlenbergia polypogon Kunth, Rév. Gram. 1: 64. 1829. Based on *Trichochloa polypogon* DC.
Agrostis setosa Willd. ex Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 300. 1841, as synonym of *Muhlenbergia capillaris*. "Willd. hb. 1682," received from Muhlenberg.
- MUHLENBERGIA CAPILLARIS** var. **FILIPES** (M. A. Curtis) Chapm. ex Beal, Grasses N. Amer. 2: 256. 1896. Based on *M. filipes* M. A. Curtis.
Stipa sericea Michx., Fl. Bor. Amer. 1: 54. 1803. South Carolina, Michaux.
Agrostis sericea Ell., Bot. S. C. and Ga. 1: 135. 1816. Based on *Stipa sericea* Michx. In Muhl., Descr. Gram. 64. 1817, the name is misapplied to *M. capillaris* (Lam.) Trin.
Polypogon sericeus Spreng., Syst. Veg. 1:

243. 1825. Based on *Stipa sericea* Michx.
Stipa cericea Michx. ex Raf., Neogen 4.
 1825. Error for *S. sericea*.
Muhlenbergia filipes M. A. Curtis, Amer. Jour. Sci. 44: 83. 1843. Sea Islands of North Carolina; Florida [M. A. Curtis].
Podosaeum filipes Bush, Amer. Midl. Nat. 7: 29. 1921. Based on *Muhlenbergia filipes* M. A. Curtis.
- (19) *Muhlenbergia curtifolia* Scribn., Torrey Bot. Club Bul. 38: 328. 1911. Between Kanab and Carmel, Utah, Jones 6047j. *Muhlenbergia curtifolia* subsp. *griffithsii* Scribn., Torrey Bot. Club Bul. 38: 328. 1911. Du Chelly Canyon, Ariz., Griffiths 5837.
- (43) *Muhlenbergia curtisetosa* (Scribn.) Bush, Amer. Midl. Nat. 6: 35. 1919. Based on *M. schreberi* subsp. *curtisetosa* Scribn.
Muhlenbergia schreberi subsp. *curtisetosa* Scribn., Rhodora 9: 17. 1907. Illinois, Wolf in 1881.
- (24) *Muhlenbergia cuspidata* (Torr.) Rydb., Torrey Bot. Club Bul. 32: 599. 1905. Based on *Vilfa cuspidata* Torr.
Agrostis brevifolia Nutt., Gen. Pl. 1: 44. 1818. Fort Mandan [N. Dak.].
Vilfa cuspidata Torr. in Hook., Fl. Bor. Amer. 2: 238. 1840. Saskatchewan River, Rocky Mountains, Drummond.
Vilfa gracilis Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4: 104. 1840. Not *V. gracilis* Trin., op. cit. 74. North America, received from Hooker.
- Sporobolus cuspidatus* Wood, Amer. Bot. and Flor. pt. 2: 385. 1871. Based on *Vilfa cuspidata* Torr.
Sporobolus brevifolius Scribn., Torrey Bot. Club Mem. 5: 39. 1894. Not *S. brevifolius* Nees, 1841. Based on *Agrostis brevifolia* Nutt. As new, Nash, in Britton, Man. 105. 1901, same basis.
Muhlenbergia brevifolia Jones, West. Bot. Contrib. 14: 12. 1912. Not *M. brevifolia* Scribn., 1896. Based on *Agrostis brevifolia* Nutt.
- (11) *Muhlenbergia depauperata* Scribn., Bot. Gaz. 9: 187. 1884. Arizona, Pringle, in 1884.
Muhlenbergia schaffneri Fourn., Mex. Pl. 2: 85. 1886. Mexico, Tacubaya, Schaffner 50, 514; Mirador, Schaffner 142.
Lycurus schaffneri Mez, Repert. Sp. Nov. Fedde 17: 212. 1921. Based on *Muhlenbergia schaffneri* Fourn.
- (58) *Muhlenbergia dubia* Fourn. in Hemsl., Biol. Centr. Amer. Bot. 3: 540. 1885. Chinantla, Mexico, Liebmman [688].
Muhlenbergia acuminata Vasey, Bot. Gaz. 11: 337. 1886. New Mexico, Wright 1993.
Sporobolus ligulatus Vasey and Dewey, U. S. Natl. Herb. Contrib. 1: 268.
1893. Presidio County, Tex., Nealley, 127.
Sporobolus inflatus Vasey and Dewey ex Beal, Grasses N. Amer. 2: 289. 1896. Error for *S. ligulatus* Vasey and Dewey.
Crypsinna breviglumis Jones, West. Bot. Contrib. 14: 8. 1912. Chihuahua, Mexico [Jones in 1903].
- (59) *Muhlenbergia dubioides* C. O. Goodding, Wash. Acad. Sci. Jour. 30: 20. 1940. Box Canyon, Ariz., Silveus 3490.
- (30) *Muhlenbergia dumosa* Scribn. in Vasey, U. S. Natl. Herb. Contrib. 3: 71. 1892. Santa Catalina Mountains, Ariz., Pringle [in 1884], Lemmon; Mexico, Pringle; southern California, Orcutt.
Muhlenbergia dumosa var. *minor* Scribn. in Beal, Grasses N. Amer. 2: 261. 1896. Mexico, Pringle 2355.
- (6) *Muhlenbergia eludens* C. G. Reeder, Wash. Acad. Sci. Jour. 39: 365. f. 1, B. 1949. Minaca, Chihuahua, Mex., Hitchcock 7768.
- (67) *Muhlenbergia emersleyi* Vasey, U. S. Natl. Herb. Contrib. 3: 66. 1892. Southern Arizona, Emersley.
Muhlenbergia vaseyana Scribn., Mo. Bot. Gard. Rpt. 10: 52. 1899. Based on *M. distichophylla* as described by Vasey (Rothr. in Wheeler, U. S. Survey W. 100th Merid. Rpt. 6: 283. 1878, Arizona, Rothrock 282, type).
Epicampes emersleyi Hitchc., U. S. Dept. Agr. Bul. 772: 144. 1920. Based on *Muhlenbergia emersleyi* Vasey.
Epicampes subpatens Hitchc., U. S. Dept. Agr. Bul. 772: 144. 1920. Guadalupe Mountains, N. Mex., Hitchcock 13541.
- (60) *Muhlenbergia expansa* (DC.) Trin., Gram. Pan. 26. 1826. Based on *Trichochloa expansa* DC.
Agrostis arachnoidea Poir., in Lam., Encycl. Sup. 1: 249. 1810. Carolina, Bosc.
Trichochloa purpurea Beauv., Ess. Agrost. 29. pl. 8. f. 2. 1812. United States.
Vilfa arachnoidea Beauv., Ess. Agrost. 147, 181. 1812. Presumably based on *Agrostis arachnoidea* Poir.
Podosaeum purpureum Beauv., Ess. Agrost. 176, 179. pl. 8. f. 2. 1812. Based on *Trichochloa purpurea* Beauv.
Trichochloa expansa DC., Cat. Hort. Monsp. 151. 1813. Carolina, Bosc.
Stipa expansa Poir. doubtfully cited.
Agrostis rubicunda Bosc. ex DC., Cat. Hort. Monsp. 151. 1813, as synonym of *Trichochloa expansa* DC.
Agrostis trichopodes Ell., Bot. S. C. and Ga. 1: 135. pl. 8. f. 1. 1816. Chatham County, Ga., Baldwin.
Cinna arachnoidea Kunth, Rév. Gram. 1: 67. 1829. Based on *Agrostis arachnoidea* Poir.
Muhlenbergia arachnoidea Trin. ex Kunth, Enum Pl. 1: 207. 1833, as synonym of *Cinna arachnoidea* Kunth.

- Agrostis expansa* Poir. ex Steud., Nom. Bot. ed. 2: 1: 40. 1840, as synonym of *Cinna arachnoidea* Kunth.
- Agrostis longiflora* Willd. ex Steud., Nom. Bot. ed. 2: 1: 41. 1840, as synonym of *Cinna arachnoidea* Kunth.
- Muhlenbergia trichopodes* Chapm., Fl. South. U. S. 553. 1860. Based on *Agrostis trichopodes* Ell.
- Muhlenbergia caespitosa* Chapm., Bot. Gaz. 3: 18. 1878. Apalachicola, Fla., Chapman.
- Muhlenbergia capillaris* var. *trichopodes* Vasey, U. S. Natl. Herb. Contrib. 3: 66. 1892. Based on *Agrostis trichopodes* Ell.
- Podosiaemum trichopodes* Bush, Amer. Midl. Nat. 7: 30. 1921. Based on *Agrostis trichopodes* Ell.
- (46) *Muhlenbergia filiculmis* Vasey, U. S. Natl. Herb. Contrib. 1: 267. 1893. Green Mountain Falls, Colo., Sheldon [321].
- (13) *Muhlenbergia filiformis* (Thurb.) Rydb., Torrey Bot. Club Bul. 32: 600. 1905. Based on *Vilfa depauperata* var. *filiformis* Thurb.
- Vilfa depauperata* var. *filiformis* Thurb. in S. Wats. in King, Geol. Expl. 40th Par. 5: 376. 1871. Yosemite Valley, Calif., Bolander 6091; Donner Lake, Torrey 565; East Humboldt Mountains, Nev., Watson 1280; Uinta Mountains, Utah, Watson 1281.
- Vilfa gracillima* Thurb. in S. Wats., Bot. Calif. 2: 268. 1880. Not *Muhlenbergia gracillima* Torr. 1856. California, Sierra Nevada, Brewer [2827]; Yosemite Valley, Bolander [6091].
- Sporobolus gracillimus* Vasey, Grasses U. S. Descr. Cat. 44. 1885. Based on *Vilfa gracillima* Thurb.
- Sporobolus filiformis* Rydb., U. S. Natl. Herb. Contrib. 3: 189. 1895. Based on *Vilfa depauperata* var. *filiformis* Thurb.
- Sporobolus depauperatus* var. *filiformis* Beal, Grasses N. Amer. 2: 296. 1896. Montana, Williams; Utah, Jones.
- Sporobolus simplex* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 11: 48. 1898. Georgetown, Colo., Rydberg 2411.
- Sporobolus aristatus* Rydb., Torrey Bot. Club Bul. 28: 266. 1901. Not *Muhlenbergia aristata* Pers. 1805. Big Horn Mountains, Wyo., Tweedy 2196.
- Sporobolus simplex* var. *thermale* Merr., Rhodora 4: 48. 1902. Lolo Hot Springs Mont., Griffiths 302a.
- Muhlenbergia simplex* Rydb., Torrey Bot. Club Bul. 32: 600. 1905. Not *M. simplex* Kunth, 1829. Based on *Sporobolus simplex* Scribn.
- Muhlenbergia aristulata* Rydb., Torrey Bot. Club Bul. 32: 600. 1905. Based on *Sporobolus aristatus* Rydb.
- Muhlenbergia filiformis* var. *fortis* E. H. Kelso, Rhodora 38: 298. 1936. Based on *Sporobolus simplex* Scribn.
- Muhlenbergia idahoensis* St. John, Fl. Southeast. Wash. and Adj. Idaho 50. 1937. Zaza, Nez Perce County, Idaho, St. John 9085.
- (3) *Muhlenbergia fragilis* Swallen, U. S. Natl. Herb. Contrib. 29: 206. 1947. Alpine, Brewster County, Tex., Warrnack 517.
- (38) *Muhlenbergia frondosa* (Poir.) Fernald, Rhodora 45: 235. pl. 750. 1943. Based on *Agrostis frondosa* Poir.
- Agrostis frondosa* Poir. in Lam., Encycl. Sup. 1: 252. 1790. Described from a cultivated or adventive specimen grown in Germany.
- Agrostis lateriflora* Michx. Fl. Bor. Amer. 1: 53. 1803. Mississippi River [Illinois], Michaux.
- Vilfa lateriflora* Beauv., Ess. Agrost. 16, 147, 181. 1812. Based on *Agrostis lateriflora* Michx. (Appears erroneously as *laterifolia* on pages 16 and 147, but correctly on page 181.)
- Cinna lateriflora* Kunth, Rév. Gram. 1: 67. 1829. Based on *Agrostis lateriflora* Michx.
- Muhlenbergia lateriflora* Trin. ex Kunth, Enum. Pl. 1: 207. 1833, as synonym of *Cinna lateriflora* Kunth.
- Calamagrostis compressa* Doell in Mart., Fl. Bras. 2^a: 56. 1878. "E seminibus a cl. Glaziou prope Rio de Janeiro lectis in horto bot. Monacensi anno 1869 cultura enata." A specimen named in Doell's script and bearing the above data was examined in Doell's herbarium in the Botanical Institute at Freiburg. This agrees perfectly with Doell's description. It is a characteristic specimen of *Muhlenbergia frondosa* except that the rachilla is minutely produced beyond the palea, a very rare occurrence in *Muhlenbergia*. Presumably the seed from Rio de Janeiro failed to germinate, and this species, probably in a neighboring plot, intruded.
- MUHLenbergia FRONDOSA forma COMMUTATA (Scribn.) Fernald, Rhodora 45: 235. 1943. Based on *M. mexicana* subsp. *commutata* Scribn.
- Muhlenbergia mexicana* subsp. *commutata* Scribn., Rhodora 9: 18. 1907. Maine, Fernald 522 in 1896.
- Muhlenbergia mexicana* var. *commutata* Farwell, Mich. Acad. Sci. Rpt. 17: 181. 1916. Based on *M. mexicana* subsp. *commutata* Scribn.
- Muhlenbergia commutata* Bush, Amer. Midl. Nat. 6: 61. 1919. Based on *M. mexicana* subsp. *commutata* Scribn.
- Muhlenbergia mexicana* forma *commutata* Wiegand, Rhodora 26: 1. 1924. Based on *M. mexicana* subsp. *commutata* Scribn.

- (39) *Muhlenbergia glabriflora* Scribn., Rhodora 9: 22. 1907. Texas, *Reverchon* 5.
- (20) *Muhlenbergia glauca* (Nees) Mez, Repert. Sp. Nov. Fedde 17: 214. 1921. Based on *Podosaemum glaucum* Nees. In Index Kewensis this name is credited to Nees in Linnaea 19: 689. 1847, but the name there is *Podosaemum glaucum*. *Podosaemum glaucum* Nees, Linnaea 19: 689. 1847. Mexico, *Aschenborn* 335. *Agrostis glauca* Steud., Syn. Pl. Glum. 1: 175. 1854. Not *A. glauca* Muhl., 1817. Based on *Podosaemum glaucum* Nees.
- Muhlenbergia lemmoni* Scribn. in Coulter, U. S. Natl. Herb. Contrib. 1: 56. 1890. Ballinger, Tex., *Nealley*; New Mexico; Arizona. [*Lemmon* 2918, type, the species being named for Lemmon] Mexico.
- Muhlenbergia huachucana* Vasey, U. S. Natl. Herb. Contrib. 3: 69. 1892. Huachuca Mountains, Ariz., *Lemmon* [2915].
- (32) *Muhlenbergia glomerata* (Willd.) Trin., Gram. Unifl. 191. pl. 5. f. 10. 1824. Based on *Polypogon glomeratus* Willd.
- Polypogon setosus* Bieler, Pl. Nov. Herb. Spreng. Cent. 7. 1807. Pennsylvania, *Muhlenberg*. Not *Muhlenbergia setosa* Kunth, 1829.
- Polypogon glomeratus* Willd., Enum. Pl. 87. 1809. North America [Pennsylvania].
- Agrostis setosa* Muhl., Cat. Pl. 10. 1813. "Polypogon W." cited.
- Alopecurus glomeratus* Poir., in Lam., Encycl. 5: 495. 1817. Based on *Polypogon glomeratus* Willd.
- Agrostis setosa* Muhl., Descr. Gram. 68. 1817. Pennsylvania. "*Polypogon setosus* C. Sprengel, *glomeratus* Willd." cited.
- Agrostis festucoides* Muhl. ex. Roem and Schult., Syst. Veg. 1: 326. 1817, as synonym of *Polypogon glomeratus* Willd.
- Trichochloa glomerata* Trin., Fund. Agrost. 117. 1820. Based on *Polypogon glomeratus* Willd.
- Trichochloa calycina* Trin., Fund. Agrost. 117. 1820. "*Agrostis setosa* Spreng." (ined.) cited; no description.
- Agrostis setosa* Spreng. ex Trin., Fund. Agrost. 117. 1820. As synonym of *Trichochloa calycina* Trin., not *A. setosa* Spreng. himself, 1824 (see synonymy under *Muhlenbergia microsperma*).
- Muhlenbergia calycina* Trin., Gram. Unifl. 193. 1824. Based on *Trichochloa calycina* Trin., and cited as synonym of "*Polypogon setosus* Spreng."
- Podosaemum glomeratum* Link, Hort. Berol. 1: 84. 1827. Based on *Polypogon glomeratus* Willd.
- Cinna glomerata* Link, Hort. Berol. 2: 237. 1833. Not *C. glomerata* Walt., 1788. Based on *Podosaemum glomeratum* Link.
- Dactylogramma cinnoides* Link, Hort. Berol. 2: 248. 1833. Grown in Berlin, seed from *Richardson*, western North America.
- Muhlenbergia setosa* Trin. ex Jacks., Ind. Kew. 2: 269. 1894. Not *Muhlenbergia setosa* Kunth, 1829. Based on "*Polypogon setosus* Spreng."
- Muhlenbergia racemosa* subsp. *violacea* Scribn., Rhodora 9: 22. 1907. North Hannibal, N. Y., *Pearce* in 1883.
- Muhlenbergia setosa* var. *cinnoides* Fernald, Rhodora 45: 238. 1943. Based on *Dactylogramma cinnoides* Link.
- Muhlenbergia glomerata* var. *cinnoides* Hermann, Rhodora 48: 64. 1946. Based on *Dactylogramma cinnoides* Link.
- (66) *Muhlenbergia involuta* Swallen, Amer. Jour. Bot. 19: 436. f. 2. 1932. San Antonio, Tex., *Silveus* 358.
- (44) *Muhlenbergia jonesii* (Vasey) Hitchc., in Jepson, Fl. Calif. 1: 111. 1912. Based on *Sporobolus jonesii* Vasey.
- Sporobolus jonesii* Vasey, Bot. Gaz. 6: 297. 1881. Soda Springs, Calif., *Jones* [303] in 1881.
- (65) *Muhlenbergia lindheimeri* Hitchc., Wash. Acad. Sci. Jour. 24: 291. 1934. Texas, *Lindheimer* 725. (This species has been referred to *Epicampes berlandieri* Fourn., and to *Muhlenbergia fournieriana* Hitchc., based upon it, but that species is confined to Mexico.)
- Epicampes gracilis* Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4: 271. 1841. Not *Muhlenbergia gracilis* Kunth, 1829. Mexico [eastern Texas, probably *Berlandier*].
- (64) *Muhlenbergia longiligula* Hitchc., Amer. Jour. Bot. 21: 136. 1934. Based on *Epicampes ligulata* Scribn.
- Epicampes ligulata* Scribn. in Vasey, U. S. Natl. Herb. Contrib. 3: 58. 1892. Not *Muhlenbergia ligulata* Scribn. and Merr. Texas to Arizona [type, Santa Rita Mountains, *Pringle* in 1884] and Mexico.
- Epicampes distichophylla* var. *mutica* Scribn. in Beal, Grasses N. Amer. 2: 308. 1896. Arizona, *Toumey* 740 [type]; Mexico, *Pringle* 1427. The other specimens cited do not agree with the description.
- Epicampes anomala* Scribn. in Beal, Grasses N. Amer. 2: 311. 1896. Not *Muhlenbergia anomalis* Fourn., 1886. Chihuahua, Mexico, *Pringle* 1423.
- Melica anomala* Scribn., in Beal, Grasses N. Amer. 2: 311. 1896, as synonym of *Epicampes anomala*.
- Epicampes stricta* var. *mutica* Jones, West. Bot. Contrib. 14: 6. 1912. Based on *E. distichophylla* var. *mutica* Scribn.
- (70) *Muhlenbergia marshii* I. M. Johnston, Arnold Arboretum Jour. 24: 392. 1943. Coahuila, Mex., *Marsh* 746.
- (57) *Muhlenbergia metcalfei* Jones, West.

- Bot. Contrib. 14: 12. 1912. Santa Rita Mountains, N. Mex., *Metcalfe* 1485. The name was published as "*Metcalfi*."
- (41) *Muhlenbergia mexicana* (L.) Trin., Gram. Unifl. 189. 1824.
- Agrostis mexicana* L., Mant. Pl. 1: 31. 1767. Grown at Upsala, tropical America erroneously given as the source, received from Jacquin.
- Vilfa mexicana* Beauv., Ess. Agrost. 16, 148, 181. 1812. Based on *Agrostis mexicana* L.
- Cinna? mexicana* Beauv., Ess. Agrost. 32, 148, 158. 1812. Based on *Agrostis mexicana* L.
- Trichochloa mexicana* Trin., Fund. Agrost. 117. 1820. Based on *Agrostis mexicana* L.
- Podosaeum mexicanum* Link, Hort. Berol. 1: 84. 1827. Based on *Agrostis mexicana* L.
- Cinna arundinacea* Retz. ex Steud., Nom. Bot. ed. 2. 1: 365. 1840. Not *C. arundinacea* L., 1753. As synonym of *C. mexicana* Beauv.
- Muhlenbergia mexicana* var. *purpurea* Wood, Amer. Bot. and Flor. pt. 2: 386. 1871. Illinois, Wolf.
- Polypogon canadensis* Fourn., Mex. Pl. 2: 92. 1886. Based on *Agrostis mexicana* L.
- Muhlenbergia polystachya* Mackenz. and Bush, Man. Fl. Jackson County 23. 1902. Sibley, Mo., *Mackenzie* 637.
- Lepyroxis canadensis* Beauv. ex Jacks., Ind. Kew Suppl. 1: 244. 1906, as synonym of *Agrostis mexicana* L.
- MUHLENBERGIA MEXICANA forma AMBIGUA (Torr.) Fernald, Rhodora 45: 236. 1943. Based on *M. ambigua* Torr.
- Agrostis filiformis* Willd., Enum. Pl. 1: 95. 1809. Not *A. filiformis* Vill., 1787, nor *Muhlenbergia filiformis* Rydb., 1905. [Pennsylvania] North America.
- Agrostis foliosa* "Hortul." Roem. and Schult., Syst. Veg. 2: 373. 1817. Garden specimen; seed from North America.
- Trichochloa foliosa* Trin., Fund. Agrost. 117. 1820. Based on *Agrostis filiformis* Willd.
- Cinna filiformis* Link, Enum. Pl. 1: 70. 1821. Based on *Agrostis filiformis* Willd.
- Agrostis lateriflora* var. *filiformis* Torr., Fl. North. and Mid. U. S. 1: 86. 1823. Based on *A. filiformis* Muhl. (error for Willd.).
- Trichochloa filiformis* Trin. ex Torr., Fl. North. and Mid. U. S. 1: 86. 1823, as synonym of *Agrostis lateriflora* var. *filiformis* Torr.
- Podosaeum foliosum* Link, Hort. Berol. 1: 83. 1827. Based on *Agrostis foliosa* Roem. and Schult.
- Muhlenbergia ambigua* Torr. in Nicoll., Rpt. Miss. 164. 1843. "Okaman Lake, Sioux Country," Geyer.
- Muhlenbergia mexicana* var. *filiformis* Vasey, Grasses U. S. 23. 1883. Name only.
- Muhlenbergia mexicana filiformis* Scribn., Torrey Bot. Club Mem. 5: 36. 1894. Based on *A. filiformis* Muhl. (error for Willd.).
- Muhlenbergia foliosa ambigua* Scribn., Rhodora 9: 20. 1907. Based on *M. ambigua* Torr.
- Muhlenbergia ambigua* var. *filiformis* Farwell, Mich. Acad. Sci. Rpt. 20: 168. 1919. Based on *Agrostis filiformis* Muhl. [error for Willd.].
- Muhlenbergia foliosa* forma *ambigua* Wiegand, Rhodora 26: 1. 1924. Based on *M. ambigua* Torr.
- MUHLENBERGIA MEXICANA forma SETIGLUMIS (S. Wats.) Fernald, Rhodora 45: 236. 1943. Based on *M. sylvatica* var. *setiglumis* S. Wats.
- Muhlenbergia sylvatica* var. *setiglumis* S. Wats. in King, Geol. Expl. 40th Par. 5: 378. 1871. Humboldt Pass, Nev., Watson 1288.
- Muhlenbergia foliosa setiglumis* Scribn., Rhodora 9: 20. 1907. Based on *M. sylvatica* var. *setiglumis* S. Wats.
- Muhlenbergia setiglumis* Nels. and Macbr., Bot. Gaz. 61: 30. 1916. Based on *M. sylvatica* var. *setiglumis* S. Wats.
- (7) *Muhlenbergia microsperma* (DC.) Kunth, Rév. Gram. 1: 64. 1829. Based on *Trichochloa microsperma* DC.
- Trichochloa microsperma* DC., Cat. Hort. Monsp. 151. 1813. Mexico.
- Podosaeum setosum* H. B. K., Nov. Gen. et Sp. 1: 129. 1815. Mexico, *Humboldt* and *Bonpland*.
- Podosaeum debile* H. B. K., Nov. Gen. et Sp. 1: 128. 1815. Ecuador, *Humboldt* and *Bonpland*.
- Agrostis microsperma* Lag., Gen. et Sp. Nov. 2. 1816. Mexico, *Sessé*.
- Trichochloa debilis* Roem. and Schult., Syst. Veg. 2: 385. 1817. Based on *Podosaeum debile* H. B. K.
- Trichochloa setosa* Roem. and Schult., Syst. Veg. 2: 386. 1817. Based on *Podosaeum setosum* H. B. K.
- Muhlenbergia fasciculata* Trin., Gram. Unifl. 192. 1824. North America.
- Agrostis setosa* Spreng., Syst. Veg. 1: 262. 1825. Based on *Podosaeum setosum* H. B. K.
- Agrostis debilis* Spreng., Syst. Veg. 1: 262. 1825. Not *A. debilis* Poir., 1810. Based on *Podosaeum debile* H. B. K.
- Muhlenbergia setosa* Kunth, Rév. Gram. 1: 63. 1829. Based on *Podosaeum setosum* H. B. K.
- Muhlenbergia debilis* Kunth, Rév. Gram. 1: 63. 1829. Based on *Podosaeum debile* H. B. K.
- Agrostis microcarpa* Steud., Nom. Bot. ed.

2. 1: 41. 1840; 2: 164. 1841, as synonym of *Muhlenbergia microsperma* Kunth.
- Muhlenbergia purpurea* Nutt., Acad. Nat. Sci. Phila. Jour. II. 1: 186. 1848. Santa Barbara and Santa Catalina Island, Calif., *Gambel*.
- Muhlenbergia ramosissima* Vasey, Torrey Bot. Club Bul. 13: 231. 1886. Chihuahua, Mexico, *Palmer* [158] in 1885.
- (2) *Muhlenbergia minutissima* (Steud.) Swallen, U. S. Natl. Herb. Contrib. 29: 207. 1947. Based on *Agrostis minutissima* Steud.
- Agrostis minutissima* Steud., Syn. Pl. Glum. 1: 171. 1854. New Mexico, *Fendler* 986.
- Sporobolus minutissimus* Hitchc., Biol. Soc. Wash. Proc. 41: 161. 1928. Based on *Agrostis minutissima* Steud.
- This is the species described in the Manual, ed. 1, under *Sporobolus microspermus* (Lag.) Hitchc. That is the same as *Muhlenbergia confusa* (Fourn.) Swallen, known only from Mexico and Guatemala.
- (45) *Muhlenbergia montana* (Nutt.) Hitchc., U. S. Dept. Agr. Bul. 772: 145, 147. 1920. Based on *Calycodon montanum* Nutt.
- Calycodon montanum* Nutt., Acad. Nat. Sci. Phila. Jour. II. 1: 186. 1848. Santa Fe, [New] Mexico, *Gambel*.
- Muhlenbergia gracilis* var. *breviaristata* Vasey in Rothr., Cat. Pl. Survey W. 100th Merid. 54. 1874. Twin Lakes, Colo., [Wolf] 1090 in 1873.
- Muhlenbergia gracilis* var. *major* Vasey in Rothr., in Wheeler, U. S. Survey W. 100th Merid. Rpt. 6: 284. 1878. Mount Graham, Ariz., Wheeler Exped. [*Rothrock*] 744.
- Muhlenbergia subalpina* Vasey, Grasses U. S. Descr. Cat. 40. 1885. Based on *M. gracilis* var. *breviaristata* Vasey.
- Muhlenbergia trifida* Hack., Repert. Sp. Nov. Fedde 8: 518. 1910. Michoacan, Mexico, *Arsène* 3217.
- This is the species referred to *Muhlenbergia gracilis* by American authors, not *M. gracilis* (H. B. K.) Kunth.
- (48) *Muhlenbergia monticola* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 91. 1862. "Northwestern Texas," [*Wright* 731].
- Muhlenbergia sylvatica* var. *flexuosa* Vasey in Rothr., in Wheeler, U. S. Survey W. 100th Merid. Rpt. 6: 284. 1878. New Mexico, *Wright* 731; Camp Crittenden, Ariz., *Rothrock* 681.
- (69) *Muhlenbergia mundula* I. M. Johnston, Arnold Arboretum Jour. 24: 392. 1943. Chihuahua, Mexico, *Pringle* 417.
- (49) *Muhlenbergia parvigiumis* Vasey, U. S. Natl. Herb. Contrib. 3: 71. 1892. Texas, *Nealley*.
- (22) *Muhlenbergia pauciflora* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 91. 1862. Western Texas [*Wright* 732].
- Muhlenbergia sylvatica* var. *pringlei* Scribn., Torrey Bot. Club Bul. 9: 89. 1882. Santa Rita Mountains, N. Mex., *Pringle* 480.
- Muhlenbergia neo-mexicana* Vasey, Bot. Gaz. 11: 337. 1886. New Mexico [type, *G. R. Vasey*] and Arizona.
- Muhlenbergia pringlei* Scribn. in Vasey, U. S. Natl. Herb. Contrib. 3: 71. 1892. Santa Rita Mountains, Ariz., *Pringle* 480.
- (10) *Muhlenbergia pectinata* C. O. Goodding, Wash. Acad. Sci. Jour. 31: 505. 1941. Guadalajara, Mexico, *Pringle* 1745.
- (21) *Muhlenbergia polycaulis* Scribn., Torrey Bot. Club Bul. 38: 327. 1911. Chihuahua, Mexico, *Pringle* 1414.
- (51) *Muhlenbergia porteri* Scribn. in Beal, Grasses N. Amer. 2: 259. 1896. Based on *M. texana* Thurb.
- Muhlenbergia texana* Thurb.; Port. and Coult., Syn. Fl. Colo. 144. 1874. Not *M. texana* Buckl., 1863. Texas, *Bigelow; Parry; Wright* 734.
- Podosaemum porteri* Bush, Amer. Midl. Nat. 7: 36. 1921. Based on *Muhlenbergia porteri* Scribn.
- (9) *Muhlenbergia pulcherrima* Scribn. in Beal, Grasses N. Amer. 2: 240. 1896. Sierra Madre, Mexico, *Pringle* 1416.
- (50) *Muhlenbergia pungens* Thurb. in A. Gray, Acad. Nat. Sci. Phila. Proc. 1863: 78. 1863. Rocky Mountains, Colo., *Hall and Harbour* 632.
- Podosaemum pungens* Bush, Amer. Midl. Nat. 7: 32. 1921. Not *P. pungens* Link, 1827. Based on *Muhlenbergia pungens* Thurb.
- (33) *Muhlenbergia racemosa* (Michx.) B. S. P., Prel. Cat. N. Y. 67. 1888. Presumably based on *Agrostis racemosa* Michx.
- Agrostis racemosa* Michx., Fl. Bor. Amer. 1: 53. 1803. Mississippi River [Ill.], *Michaux*.
- Vilfa racemosa* Beauv., Ess. Agrost. 16, 148, 182. 1812. Based on *Agrostis racemosa* Michx.
- Polypogon racemosus* Nutt., Gen. Pl. 1: 51. 1818. Based on *Agrostis racemosa* Michx.
- Cinna racemosa* Kunth, Rév. Gram. 1: 67. 1829. Based on *Agrostis racemosa* Michx.
- Muhlenbergia glomerata* var. *ramosa* Vasey, Grasses U. S. Descr. Cat. 40. 1885. Illinois to Colorado and Montana. [Type, collected by *Vasey*, marked "Dakota and Wisconsin."]
- Muhlenbergia racemosa* var. *ramosa* Vasey ex Beal, Grasses N. Amer. 2: 253. 1896. Presumably based on *M. glomerata* var. *ramosa* Vasey.
- (14) *Muhlenbergia repens* (Presl) Hitchc. in Jepson, Fl. Calif. 1: 111. 1912. Based on *Sporobolus repens* Presl.

- Sporobolus repens* Presl, Rel. Haenk. 1: 241. 1830. Mexico, *Haenke*.
- Vilfa repens* Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 102. 1840. Based on *Sporobolus repens* Presl.
- Muhlenbergia subtilis* Nees, Linnaea 19: 689. 1847. Mexico, *Aschenborn* 206.
- Muhlenbergia abata* I. M. Johnston, Arnold Arboretum Jour. 24: 387. 1943. Valley of the Rio Grande, New Mexico, *Wright* 1982.
- (61) *Muhlenbergia reverchoni* Vasey and Scribn., U. S. Natl. Herb. Contrib. 3: 66. 1892. Texas, *Reverchon* [73].
- Podosaemum reverchoni* Bush, Amer. Midl. Nat. 7: 38. 1921. Based on *Muhlenbergia reverchoni* Vasey and Scribn.
- (16) *Muhlenbergia richardsonis* (Trin.) Rydb., Torrey Bot. Club Bul. 32: 600. 1905. Based on *Vilfa richardsonis* Trin.
- Vilfa squarrosa* Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 100. 1840. Menzies Island [Columbia River, Wash.].
- Vilfa richardsonis* Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 103. 1840. North America, *Richardson*.
- Muhlenbergia aspericaulis* Nees ex Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 103. 1840, as synonym of *Vilfa richardsonis* Trin.
- Vilfa depauperata* Torr. in Hook., Fl. Bor. Amer. 2: 257. pl. 2. 36. 1840. Columbia River, from Menzies Island upward, *Douglas*.
- Sporobolus depauperatus* Scribn., Torrey Bot. Club Bul. 9: 103. 1882. Based on *Vilfa depauperata* Torr.
- Sporobolus aspericaulis* Scribn., Bot. Gaz. 21: 15. 1896. Based on *Muhlenbergia aspericaulis* Nees.
- Sporobolus richardsonii* Merr., Rhodora 4: 46. 1902. Based on *Vilfa richardsonis* Trin.
- Muhlenbergia squarrosa* Rydb., Torrey Bot. Club Bul. 36: 531. 1909. Based on *Vilfa squarrosa* Trin.
- Muhlenbergia brevifolia* var. *richardsonis* Jones, West. Bot. Contrib. 14: 12. 1912. Based on *Vilfa richardsonis* Trin.
- This is the species which Nash (Britton Man. 105. 1901) called *Sporobolus brevifolius*, but that name is based on *Agrostis brevifolius* Nutt., which is *Muhlenbergia cuspidata* (which see).
- (68) *Muhlenbergia rigens* (Benth.) Hitchc., Wash. Acad. Sci. Jour. 23: 453. 1933. Based on *Epicampes rigens* Benth.
- Cinna macroura* (Kunth misapplied by) Thurb. in S. Wats., Bot. Calif. 2: 276. 1880. Not *C. macroura* (H. B. K.) Kunth, 1835. California.
- Vilfa rigens* Thurb. ex S. Wats., Bot. Calif. 2: 276. 1880. Not *V. rigens* Trin., 1830. As synonym of *C. macroura* Kunth. "Sonora" [probably error for Sonoma] California, *Bolander* [6124].
- Epicampes rigens* Benth., Linn. Soc. Jour., Bot. 19: 88. 1881. Based on the species Thurb. described as *Cinna macroura*, not that of (H. B. K.) Kunth.
- Crypsinna rigens* Jones, West. Bot. Contrib. 14: 8. 1912. Based on *Epicampes rigens* Benth.
- (63) *Muhlenbergia rigida* (H. B. K.) Kunth, Rév. Gram. 1: 63. 1829. Based on *Podosaemum rigidum* H. B. K.
- Podosaemum rigidum* H. B. K., Nov. Gen. et Sp. 1: 129. 1815. Mexico, *Humboldt* and *Bonpland*.
- Trichochloa rigida* Roem. and Schult., Syst. Veg. 2: 386. 1817. Based on *Podosaemum rigidum* H. B. K.
- Muhlenbergia berlandieri* Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 299. 1841. Mexico, *Berlandier*.
- Muhlenbergia affinis* Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 301. 1841. "Toluco," *Berlandier*.
- (42) *Muhlenbergia schreberi* Gmel., Syst. Nat. 2: 171. 1791. Based on the species described by Schreber (Gen. Pl. 1: 44. 1789) under *Muhlenbergia* with no specific name [Pennsylvania].
- Muhlenbergia diffusa* Willd., Sp. Pl. 1: 320. 1797. North America. Name only, Muhl., Amer. Phil. Soc. Trans. 3: 160. 1793.
- Dilepyrum minutiflorum* Michx., Fl. Bor. Amer. 1: 40. 1803. Kentucky and Illinois, *Michaux*. Listed as *Dilepyrum multiflorum* by Beauv., Ess. Agrost. 160. 1812.
- Dilepyrum diffusum* Beauv., Ess. Agrost. 160. 1812. Name only, referred to *Muhlenbergia*. Probably the same as *M. diffusa* Willd.
- Anthipsimus gonopodus* Raf., Jour. Phys. Chym. 89: 105. 1819. Dry hills of the Ohio.
- Cynodon diffusus* Raspail, Ann. Sci. Nat., Bot. 5: 303. 1825. Based on "*Muhlenbergia* Schr." (error for Willd.).
- Agrostis apetala* Bosc. ex Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 287. 1841, as synonym of *Muhlenbergia diffusa* Schreb.
- Muhlenbergia botteri* Fourn., Mex. Pl. 2: 85. 1886. Orizaba, Mexico, *Botteri* 87.
- Muhlenbergia minutiflora* Hitchc., Kans. Acad. Sci. Trans. 14: 140. 1896. Based on *Dilepyrum minutiflorum* Michx.
- MUHLENBERGIA SCHREBERI var. PALUSTRIS (Scribn.) Scribn., Rhodora 9: 17. 1907. Based on *M. palustris* Scribn. (Published as *M. schreberi palustris*.)
- Muhlenbergia palustris* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 11: 47. 1898. District of Columbia, *Steele* in 1896.
- Muhlenbergia schreberi* var. *palustris* Scribn. ex Robinson, Rhodora 10: 65. 1908. Based on *M. palustris* Scribn.
- (55) *Muhlenbergia setifolia* Vasey, Bot.

- Gaz. 7: 92. 1882. Guadalupe Mountains, Tex., *Havard*.
- (4) **Muhlenbergia sinuosa** Swallen, U. S. Natl. Herb. Contrib. 29: 204. 1947. San Luis Mountains, New Mexico, *Mearns* 2457.
- Sporobolus confusus* var. *aberrans* Jones, West. Bot. Contrib. 14: 10. 1912. Bowie, Ariz., *Jones*.
- (35) **Muhlenbergia sobolifera** (Muhl.) Trin., Gram. Unifl. 189. pl. 5. f. 4. 1824. Based on *Agrostis sobolifera* Muhl.
- Agrostis sobolifera* Muhl. in Willd., Enum. Pl. 95. 1809. Pennsylvania. Name only, Muhl., Amer. Phil. Soc. Trans. 4: 236. 1799.
- Achnatherum soboliferum* Beauv., Ess. Agrost. 20, 146. 1812. Based on *Agrostis sobolifera* Muhl.
- Trichochloa sobolifera* Trin., Fund. Agrost. 117. 1820. Based on *Agrostis sobolifera* Muhl.
- Cinna sobolifera* Link, Enum. Pl. 1: 71. 1821. Based on *Agrostis sobolifera* Willd.
- Podosaemum soboliferum* Link, Hort. Berol. 1: 83. 1827. Based on *Agrostis sobolifera* Muhl.
- MUHLENBERGIA SOBOLIFERA var. SETIGERA Scribn., Rhodora 9: 18. 1907. Texas, *Reverchon* 70. (Published as *M. sobolifera* (subsp.) *setigera*.)
- Muhlenbergia sobolifera* forma *setigera* Deam, Ind. Dept. Conserv. Pub. 82: 163. 1929. Based on *M. sobolifera setigera* Scribn.
- (40) **Muhlenbergia sylvatica** (Torr.) Torr. in A. Gray, N. Amer. Gram. et Cyp. 1: 13. 1834. Based on *Agrostis sylvatica* Torr.
- Agrostis diffusa* Muhl., Deser. Gram. 64. 1817. Not *A. diffusa* Host, 1809. Pennsylvania.
- Agrostis sylvatica* Torr., Fl. North. and Mid. U. S. 1: 87. 1823. Not *A. sylvatica* Huds., 1762. Mountains of New Jersey.
- Muhlenbergia sylvatica* var. *gracilis* Scribn., Kans. Acad. Sci. Trans. 9: 116. 1885. Topeka, Kans., *Popenoe*.
- Muhlenbergia umbrosa* Scribn., Rhodora 9: 20. 1907. Based on *Agrostis sylvatica* Torr.
- Muhlenbergia diffusa* Farwell, Mich. Acad. Sci. Rpt. 20: 168. 1919. Not *M. diffusa* Willd., 1797. Based on *Agrostis diffusa* Muhl.
- MUHLENBERGIA SYLVATICA forma ATTENUATA (Scribn.) Palmer and Steyermark, Mo. Bot. Gard. Ann. 22: 467. 1935. Based on *M. umbrosa* subsp. *attenuata* Scribn.
- Muhlenbergia umbrosa* subsp. *attenuata* Scribn., Rhodora 9: 21. 1907. Aurora County, S. Dak., *Wilcox* 25.
- Muhlenbergia umbrosa* forma *attenuata* Deam, Ind. Dept. Conserv. Pub. 82: 171. 1929. Based on *M. umbrosa* subsp. *attenuata* Scribn.
- Muhlenbergia diffusa* var. *attenuata* Farwell, Mich. Acad. Sci. Papers 23: 125. 1938. Presumably based on *M. umbrosa* subsp. *attenuata* Scribn.
- MUHLENBERGIA SYLVATICA var. ROBUSTA Fernald, Rhodora 45: 236. 1943. Sydney, Maine, *Fernald* and *Long* 12597.
- (36) **Muhlenbergia tenuiflora** (Willd.) B. S. P., Prel. Cat. N. Y. 67. 1888. Based on *Agrostis tenuiflora* Willd.
- Agrostis tenuiflora* Willd., Sp. Pl. 1: 364. 1797. North America.
- Apera tenuiflora* Beauv., Ess. Agrost. 151. 1812. Based on *Agrostis tenuiflora* Willd.
- Trichochloa longiseta* Trin., Fund. Agrost. 117. 1820. Based on *Agrostis tenuiflora* Willd. Erroneously given as *T. longiflora* Trin., in Kunth, Enum. Pl. 1: 601. 1833.
- Cinna tenuiflora* Link, Enum. Pl. 1: 71. 1821. Based on *Agrostis tenuiflora* Willd.
- Muhlenbergia wildenowii* Trin., Gram. Unifl. 188. pl. 5. f. 3. 1824. Based on *Agrostis tenuiflora* Willd.
- Trichochloa tenuiflora* Sweet, Hort. Brit. 443. 1826. Based on *Agrostis tenuiflora* Willd.
- Podosaemum tenuiflorum* Link, Hort. Berol. 1: 82. 1827. Based on *Agrostis tenuiflora* Willd.
- Muhlenbergia tenuiflora* subsp. *variabilis* Scribn., Rhodora 9: 18. 1907. Chimney Mountain, N. C., *Biltmore Herbarium* 654a.
- (5) **Muhlenbergia texana** Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 91. 1862. Northern Texas.
- Agrostis barbata* Buckl. ex A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 334. 1862. Not *A. barbata* Pers., 1805. As synonym of *Muhlenbergia texana* Buckl.
- Muhlenbergia buckleyana* Scribn., U. S. Natl. Herb. Contrib. 1: 56. 1890. Based on *M. texana* Buckl.
- Podosaemum texanum* Bush, Amer. Midl. Nat. 7: 41. 1921. Based on *Muhlenbergia texana* Buckl.
- (18) **Muhlenbergia thurberi** Rydb., Torrey Bot. Club Bul. 32: 601. 1905. Based on *Sporobolus filiculmis* Vasey ex Beal.
- Vilfa filiculmis* Thurb., also cited, is a name only, and no reference is made to *Sporobolus thurberi* Scribn.
- Sporobolus filiculmis* Vasey, Deser. Cat. Grasses U. S. 44. 1885, name only; Vasey ex Beal, Grasses N. Amer. 2: 288. 1896. Not *S. filiculmis* L. H. Dewey, 1894. New Mexico, Whipple Exped. [Plaza Larga, *Bigelow* 778].
- Vilfa filiculmis* Thurb. ex Vasey, Deser. Cat. Grasses U. S. 44. 1885, as synonym of *Sporobolus filiculmis* Vasey.
- Sporobolus thurberi* Scribn., U. S. Dept.

- Agr., Div. Agrost. Bul. 11: 48. f. 5. 1898. "*Vilfa filiculmis* Thurb." Plaza Larga, N. Mex., *Bigelow*.
- Vilfa filiculmis* Thurb. ex Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 11: 48. 1898, as synonym of *Sporobolus thurberi* Scribn.
- Muhlenbergia filiculmis* Jones, West. Bot. Contrib. 14: 12. 1912. Not *M. filiculmis* Vasey, 1893. Based on *Vilfa filiculmis* Thurb., name only.
- (28) ***Muhlenbergia torreyana*** (Schult.) Hitchc., Amer. Jour. Bot. 21: 136. 1934. Based on *Agrostis torreyana* Schult.
- Agrostis compressa* Torr., Cat. Pl. N. Y. 91. 1819. Not *A. compressa* Willd., 1790. New Jersey, *Goldy*.
- Vilfa compressa* Trin. in Spreng., Neu. Entd. 2: 58. 1821. Not *V. compressa* Beauv., 1812. North America.
- Colpodium compressum* Trin. ex Spreng., Neu. Entd. 2: 58. 1821, as synonym of *Vilfa compressa* Trin.
- Agrostis torreyana* Schult., Mantissa 2: 203. 1824. Based on *Agrostis compressa* Torr.
- Sporobolus compressus* Kunth, Enum. Pl. 1: 217. 1833. Based on *Agrostis compressa* Torr.
- Sporobolus torreyanus* Nash in Britton, Man. 107. 1901. Based on *Agrostis torreyana* Schult.
- (53) ***Muhlenbergia torreyi*** (Kunth) Hitchc. ex Bush, Amer. Midl. Nat. 6: 84. 1919. Based on *Agrostis torreyi* Kunth.
- Agrostis caespitosa* Torr., Ann. Lyc. N. Y. 1: 152. 1824. Not *A. caespitosa* Salisb., 1796, nor *Muhlenbergia caespitosa* Chapm., 1878. Prairies of Missouri and Platte River.
- Agrostis torreyi* Kunth, Rév. Gram. 1: Sup. 17. 1830. Based on *A. caespitosa* Torr.
- Muhlenbergia gracillima* Torr., U. S. Expl. Miss. Pacif. Rpt. 4: 155. 1857. Llano Estacado and near Antelope Hills, Canadian River, Tex. [*Bigelow*].
- Muhlenbergia nardifolia* Griseb., Abh. Ges. Wiss. Göttingen 24: 294. 1879. Argentina.
- Podosaemum gracillimum* Bush, Amer. Midl. Nat. 7: 33. 1921. Based on *Muhlenbergia gracillima* Torr.
- (29) ***Muhlenbergia uniflora*** (Muhl.) Fernald, Rhodora 29: 10. 1927. Based on *Poa uniflora* Muhl.
- Poa? uniflora* Muhl., Descr. Gram. 151. 1817. New England. Name only, Muhl., Cat. Pl. 11. 1813.
- Agrostis serotina* Torr., Fl. North. and Mid. U. S. 1: 88. 1823. Not *A. serotina* Lam., 1767. New Jersey.
- Vilfa serotina* Trin., Gram. Icon. 3: pl. 251. 1830. North America, "*Agrostis serotina* Nutt. ms."
- Vilfa serotina* Torr. in A. Gray, N. Amer. Gram. and Cyp. 1: 2. 1834. Based on *Agrostis serotina* Torr.
- Vilfa tenera* Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 87. 1804. Boston, *Boott*.
- Poa modesta* Tuckerm., Amer. Jour. Sci. 45: 45. 1843. Cambridge, Mass. [*Tuckerman*].
- Sporobolus serotinus* A. Gray, Man. 577. 1848. Based on *Agrostis serotina* Torr.
- Sporobolus uniflorus* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 27: 5. 1900. Based on *Poa uniflora* Muhl.
- Poa stricta uniflora* Muhl. ex Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 27: 5. 1900, as synonym of *Sporobolus uniflorus* Muhl.
- Muhlenbergia uniflora* var. *terrae-novae* Fernald, Rhodora 29: 11. 1927. Newfoundland, *Fernald*, *Long*, and *Dunbar* 26244.
- (15) ***Muhlenbergia utilis*** (Torr.) Hitchc., Wash. Acad. Sci. Jour. 23: 453. 1933. Based on *Vilfa utilis* Torr.
- Vilfa utilis* Torr., U. S. Expl. Miss. Pacif. Rpt. 5²: 365. 1858. Between Tejon Pass and Lost Hills, Calif. [*Blake*].
- Vilfa sacatilla* Fourn., Mex. Pl. 2: 101. 886. 1881. Chapultepec, Mexico, *Schaffner*; San Luis de Potosí, *Virlet* 1455; Texas, *Wright*.
- Sporobolus sacatilla* Griseb. ex Fourn., Mex. Pl. 2: 101. 1886, as synonym of *Vilfa sacatilla* Fourn.
- Sporobolus utilis* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 17: 171. f. 467. 1899. Based on *Vilfa utilis* Torr.
- (17) ***Muhlenbergia villosa*** Swallen, Wash. Acad. Sci. Jour. 31: 350. f. 2. 1941. Stanton, Tex., *Tharp* 5048.
- (47) ***Muhlenbergia virescens*** (H. B. K.) Kunth, Rév. Gram. 1: 64. 1829. Based on *Podosaemum virescens* H. B. K.
- Podosaemum virescens* H. B. K., Nov. Gen. et Sp. 1: 132. 1815. Mexico, *Humboldt* and *Bonpland*.
- Trichochloa virescens* Roem. and Schult., Syst. Veg. 2: 389. 1817. Based on *Podosaemum virescens* H. B. K.
- Muhlenbergia straminea* Hitchc., U. S. Natl. Herb. Contrib. 17: 302. 1913. Chihuahua, Mexico, *Endlich* 1210.
- (1) ***Muhlenbergia wolfii*** (Vasey) Rydb., Torrey Bot. Club Bul. 32: 600. 1905. Based on *Sporobolus wolfii* Vasey.
- Vilfa minima* Vasey, U. S. Dept. Agr. Monthly Rpt. 1874: 155. 1874. Not *V. minima* Trin. ex Steud., 1854. Twin Lakes, Colo., *Wolf* 1077.
- Sporobolus wolfii* Vasey, Torrey Bot. Club Bul. 10: 52. 1883. Twin Lakes, Colo., *Wolf* [1077].
- Sporobolus racemosus* Vasey, Torrey Bot. Club Bul. 14: 9. 1887. Chihuahua, Mexico, *Palmer* [4 B in 1885].
- This species was described under *Sporobolus ramulosus* in the Manual, ed. 1. That

species is *Muhlenbergia ramulosus* (H. B. K.) Swallen, known only from Mexico and Central America.

- (25) *Muhlenbergia wrightii* Vasey in Coulter, Man. Rocky Mount. 409. 1885. Colorado and New Mexico [type Wright 1986].

Muhlenbergia wrightii var. *annulata* Vasey, Grasses U. S. Descr. Cat. 41. 1885. Name only. [Arizona, Lemmon, 3179.]

Muhlenbergia coloradensis Mez, Repert. Sp. Nov. Fedde 17: 213. 1921. "Chiann [Cheyenne] Canyon," Colo., Jones [806].

- (56) *Muhlenbergia xerophila* C. O. Gooding, Wash. Acad. Sci. Jour. 30: 19. 1940. Sycamore Canyon, Ariz., Gooding M. 262.

(114) MUNROA Torr.

- (1) *Munroa squarrosa* (Nutt.) Torr., U. S. Expl. Miss. Pacif. Rpt. 45: 158. 1857. Based on *Crypsis squarrosa* Nutt.

Crypsis squarrosa Nutt., Gen. Pl. 1: 49. 1818. Grand detour of the Missouri River [S. Dak., Nuttall].

Munroa squarrosa var. *floccuosa* Vasey ex Beal, Grasses N. Amer. 2: 456. 1896. Arizona, [Peach Springs], Jones. (See p. 545.)

Nardus stricta L., Sp. Pl. 53. 1753. Europe.

Nassella chilensis (Trin. and Rupr.) E. Desv. in Gay, Fl. Chil. 6: 267. 1853. Based on *Urachne chilensis* Trin.

Urachne chilensis Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 1: 123. 1834. Chile.

Urachne major Trin. and Rupr., Acad. St. Pétersb. Mém. VI. Sci. Nat. 51: 21. 1842. Chile.

Nassella major E. Desv. in Gay, Fl. Chil. 6: 265. 1853. Based on *Urachne chilensis* Trin. and Rupr.

(35) NEOSTAPFIA Davy

- (1) *Neostapfia colusana* (Davy) Davy, Erythra 7: 43. 1899. Based on *Stapfia colusana* Davy.

Stapfia colusana Davy, Erythra 6: 110. pl. 3. 1898. Colusa County, Calif., Davy.

Davyella colusana Hack., Oesterr. Bot. Ztschr. 49: 134. 1899. Based on *Stapfia colusana* Davy.

Anthochloa colusana Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 17: 221. f. 517. 1899.

(29) NEYRAUDIA Hook. f.

- (1) *Neyraudia reynaudiana* (Kunth) Keng, Amer. Jour. Bot. 21: 131. 1934. Based on *Arundo reynaudiana* Kunth.

Arundo reynaudiana Kunth, Rév. Gram. 2: 275. pl. 49. 1830. Burma, Reynaud.

(147) OLYRA L.

- (1) *Olyra latifolia* L., Syst. Nat. ed. 10. 2: 1261. 1759. Jamaica, Sloane.

Olyra paniculata Swartz, Prodr. Veg. Ind. Occ. 21. 1788. Jamaica, Swartz.

Olyra arundinacea H. B. K., Nov. Gen. et Sp. 1: 197. 1816. Colombia, Humboldt and Bonpland.

Stipa latifolia Raspail, Ann. Sci. Nat., Bot. 5: 449. 1825. Based on *Olyra latifolia* L.

Olyra latifolia var. *arundinacea* Griseb., Fl. Brit. W. Ind. 535. 1864. Presumably based on *O. arundinacea* H. B. K.

(140) OPLISMENUS Beauv.

- (2) *Oplismenus hirtellus* (L.) Beauv., Ess. Agrost. 54, 168. 1812. Based on *Panicum hirtellum* L.

Panicum hirtellum L., Syst. Nat. ed. 10. 2: 870. 1759. Jamaica [Browne].

Orthopogon hirtellus Nutt., Gen. Pl. 1: 55. 1818. Based on *Panicum hirtellum* L.

Orthopogon cubensis Spreng., Syst. Veg. 1: 307. 1825. Cuba.

Echinochloa cubensis Schult., Mantissa 3 (Add. 1): 596. 1827. Based on *Orthopogon cubensis* Spreng.

Oplismenus cubensis Kunth, Rév. Gram. 1: 45. 1829. Based on *Orthopogon cubensis* Spreng.

Panicum cubense Steud., Nom. Bot. ed. 2. 2: 255. 1841. Based on *Orthopogon cubensis* Spreng.

Oplismenus chondrosioides Fourn., Mex. Pl. 2: 39. 1886. Mexico, Liebmans 367.

This species is cultivated under the name *Panicum variegatum* Hort. (see Gard. Chron. 458. 1867).

- (1) *Oplismenus setarius* (Lam.) Roem. and Schult., Syst. Veg. 2: 481. 1817. Based on *Panicum setarium* Lam.

Panicum setarium Lam., Tabl. Encycl. 1: 170. 1791. South America, Comerson.

Panicum velutinum G. Meyer, Prim. Fl. Esseq. 51. 1818. British Guiana [Meyer].

Orthopogon parvifolium Nutt., Gen. Pl. 1: 55, errata. 1818. Florida and South Carolina. On page 55 this is described under *Orthopogon hirtellus* Nutt., the name based on *Panicum hirtellum* L., but misapplied.

Setaria hirtella Schult., Mantissa 2: 276. 1824. Based on the species described by Muhlenberg (Descr. Gram. 103. 1817) under the name *Panicum hirtellum*.

Orthopogon setarius Spreng., Syst. Veg. 1: 306. 1825. Based on *Panicum setarium* Lam.

Oplismenus parvifolius Kunth, Rév. Gram. 1: 45. 1829. Based on *Orthopogon parvifolium* Nutt.

Orthopogon hirtellus Eaton and Wright, N.

Amer. Bot. ed. 8. 336. 1840. Southern States. No reference to Nuttall, nor synonym cited.

Panicum nuttallianum Steud., Nom. Bot. ed. 2. 2: 260. 1841. Based on *Orthopogon parvifolius* Nutt.

Oplismenus compositus var. *setarius* F. M. Bailey, Queensl. Grasses 19. 1888. Based on *Panicum setarium* Lam.

Hippagrostis setarius Kuntze, Rev. Gen. Pl. 2: 777. 1891. Based on *Panicum setarium* Lam.

Oplismenus hirtellus subsp. *setarius* Mez ex Ekman, Arkiv Bot. 11⁴: 26. 1912. Based on *Panicum setarium* Lam.

(36) ORCUTTIA Vasey

- (2) *Orcuttia californica* Vasey, Torrey Bot. Club Bul. 13: 219. pl. 60. 1886. San Quentin Bay, Baja California, *Orcutt*.

ORCUTTIA CALIFORNICA var. *INAEQUALIS* (Hoover) Hoover, Torrey Bot. Club Bul. 68: 154. 1941. Based on *O. inaequalis* Hoover.

Orcuttia inaequalis Hoover, Madroño 3: 229. 1936. Montpellier, Calif., *Hoover* 582.

ORCUTTIA CALIFORNICA var. *VISCIDA* Hoover, Torrey Bot. Club Bul. 68: 155. 1941. Folsom, Calif., *Hoover* 3709.

- (1) *Orcuttia greenei* Vasey, Bot. Gaz. 16: 146. 1891. Chico, Calif., *Greene*.

- (4) *Orcuttia pilosa* Hoover, Torrey Bot. Club Bul. 68: 155. 1941. Waterford, Calif., *Hoover* 3624.

- (3) *Orcuttia tenuis* Hitchc., Amer. Jour. Bot. 21: 131. 1934. Goose Valley, Shasta County, Calif., *Eastwood* 1013 (distributed in *Amer. Gr. Natl. Herb.* No. 686 as *Orcuttia californica*).

(119) ORYZA L.

- (1) *Oryza sativa* L., Sp. Pl. 333. 1753. Africa and India.

Oryza sativa var. *rubribarbis* Desv., Jour. Bot. Desv. 1: 76. 1813. Cultivated in North America.

Oryza rubribarbis Steud., Nom. Bot. 577. 1821. Based on *O. sativa* var. *rubribarbis* Desv.

Oryza sativa var. *savannae* Koern. in Koern. and Wern., Handb. Getreidebau. 1: 233, 236. 1885. Cultivated. Savannah, Ga.

(89) ORYZOPSIS Michx.

- (8) *Oryzopsis asperifolia* Michx., Fl. Bor. Amer. 1: 51. pl. 9. 1803. Hudson Bay to Quebec, *Michaux*.

Oryzopsis aspera "Mx." ex Muhl., Cat. Pl. 11. 1813., error for *O. asperifolia*.

Oryzopsis mutica Link, Enum. Pl. 1: 41. 1821. North America.

Urachne asperifolia Trin., Gram. Unifl. 174. 1824. Based on *Oryzopsis asperifolia* Michx.

Urachne leucosperma Link, Hort. Berol. 1: 94. 1827. Albany, N. Y.

Urachne mutica Steud., Nom. Bot. ed. 2. 2: 731. 1841. Based on *Oryzopsis mutica* Link.

Oryzopsis leucosperma Link ex Walp., Ann. Bot. [London] 3: 728. 1853, as synonym of *Urachne asperifolia* Trin.

- (10) *Oryzopsis bloomeri* (Boland.) Ricker in Piper, U. S. Natl. Herb. Contrib. 11: 109. 1906. Based on *Stipa bloomeri* Boland.

Stipa bloomeri Boland., Calif. Acad. Sci. Proc. 4: 168. 1872. Bloody Canyon, near Mono Lake, Calif., *Bolander* [6116].

Oryzopsis caduca Beal, Bot. Gaz. 15: 111. 1890. Belt Mountains, Mont., *Scribner*.

Stipa caduca Scribn., U. S. Natl. Herb. Contrib. 3: 54. 1892. Based on *Oryzopsis caduca* Beal.

Eriocoma caduca Rydb., N. Y. Bot. Gard. Mem. 1: 25. 1900. Based on *Stipa caduca* Scribn.

× *Stiporyzopsis caduca* B. L. Johnson and Rogler, Amer. Jour. Bot. 30: 55. f. 10, 14, 28-33. 1943. Based on *Oryzopsis caduca* Beal. "*Oryzopsis hymenoides* × *Stipa viridula*."

× *Stiporyzopsis bloomeri* B. L. Johnson, Amer. Jour. Bot. 32: 602. f. 14-18. 1945. Based on *Stipa bloomeri* Bolander. "*Oryzopsis hymenoides* × *Stipa occidentalis*."

This is the species described by Beal (Grasses N. Amer. 2: 226. 1896) under the name *Oryzopsis sibirica* Beal, but the name is based on *Stipa sibirica* Lam., not known from America.

- (6) *Oryzopsis canadensis* (Poir.) Torr., Fl. N. Y. 2: 433. 1843. Based on *Stipa canadensis* Poir.

Stipa juncea Michx., Fl. Bor. Amer. 1: 54. 1803. Not *S. juncea* L., 1753. Hudson Bay, Canada, *Michaux*.

Stipa canadensis Poir. in Lam., Encycl. 7: 452. 1806. Based on *S. juncea* Michx.

Urachne canadensis Torr. in A. Gray, N. Amer. Gram. and Cyp. 2: 114. 1835. Based on *Stipa canadensis* Poir.

Oryzopsis juncea B. S. P., Prel. Cat. N. Y. 67. 1888. Based on *Stipa juncea* Michx.

Stipa macounii Scribn. in Macoun, Can. Pl. Cat. 2⁵: 390. 1890. New Brunswick.

Oryzopsis macounii Beal, Grasses N. Amer. 2: 229. 1896. Based on *Stipa macounii* Scribn.

This is the species to which the name *Stipa richardsonii* Link was applied by A. Gray in the earlier editions of the Manual.

- (4) *Oryzopsis exigua* Thurb. in Wilkes, U. S. Expl. Exped. Bot. 17: 481. 1874. Cascade Mountains, Oreg., *Wilkes Expl. Exped.*

- (3) **Oryzopsis hendersoni** Vasey, U. S. Natl. Herb. Contrib. 1: 267. 1893. [Clements Mountain, near North Yakima] *Henderson* 2249.
Oryzopsis exigua var. *hendersoni* Jones, West. Bot. Contrib. 14: 11. 1912. Based on *O. hendersoni* Vasey.
- (12) **Oryzopsis hymenoides** (Roem. and Schult.) Ricker in Piper, U. S. Natl. Herb. Contrib. 11: 109. 1906. Based on *Stipa hymenoides* Roem. and Schult.
Stipa membranacea Pursh, Fl. Amer. Sept. 2: 728. 1814. Not *S. membranacea* L., 1753. Banks of the Missouri River, *Bradbury*.
Stipa hymenoides Roem. and Schult., Syst. Veg. 2: 339. 1817. Based on *Stipa membranacea* Pursh.
Eriocoma cuspidata Nutt., Gen. Pl. 1: 40. 1818. Grassy plains of the Missouri [type from "Platte Plains," *Nuttall*].
Milium cuspidatum Spreng., Syst. Veg. 1: 251. 1825. Based on *Eriocoma cuspidata* Nutt.
Urachne lanata Trin. and Rupr., Acad. St. Pétersb. Mém. VI. Sci. Nat. 1: 126. 1834. North America.
Eriocoma membranacea Steud., Nom. Bot. ed. 2. 1: 586. 1840, as synonym of *Urachne lanata* Trin.
Fendleria rhynchelytroides Steud., Syn. Pl. Glum. 1: 420. 1854. New Mexico, *Fendler* 979.
Oryzopsis cuspidata Benth. ex Vasey, Grasses U. S. 23. 1883. Based on *Eriocoma cuspidata* Nutt.
Oryzopsis membranacea Vasey, U. S. Dept. Agr., Div. Bot. Bul. 12²: pl. 10. 1891. Based on *Stipa membranacea* Pursh.
Eriocoma membranacea Beal, Grasses N. Amer. 2: 232. 1896. Based on *Stipa membranacea* Pursh.
Eriocoma hymenoides Rydb., Torrey Bot. Club Bul. 39: 102. 1912. Based on *Stipa hymenoides* Roem. and Schult.
- ORYZOPSIS HYMENOIDES VAR. CONTRACTA B. L. Johnson, Bot. Gaz. 107: 24. 1945. Wyoming, *Elias Nelson* 4850.
- (7) **Oryzopsis kingii** (Boland.) Beal, Grasses N. Amer. 2: 229. 1896. Based on *Stipa kingii* Boland.
Stipa kingii Boland., Calif. Acad. Sci. Proc. 4: 170. 1872. Mount Dana, Calif., *Bolander* 6076 [error for 6097].
- (2) **Oryzopsis micrantha** (Trin. and Rupr.) Thurb., Acad. Nat. Sci. Phila. Proc. 1863: 78. 1863. Based on *Urachne micrantha* Trin. and Rupr.
Urachne micrantha Trin. and Rupr., Acad. St. Pétersb. Mém. VI. Sci. Nat. 5¹: 16. 1842. North America [type from Saskatchewan].
- (1) **Oryzopsis miliacea** (L.) Benth. and Hook. ex Aschers. and Schweinf., Mém. Inst. Egypte 2: 169. 1887. Presumably based on *Agrostis miliacea* L.
Agrostis miliacea L., Sp. Pl. 61. 1753. Europe.
Achnatherum miliaceum Beauv., Ess. Agrost. 20, 146, 148. 1812. Based on *Agrostis miliacea* L.
Piptatherum miliaceum Coss., Notes Crit. 129. 1851. Based on *Agrostis miliacea* L.
- (5) **Oryzopsis pungens** (Torr.) Hitchc., U. S. Natl. Herb. Contrib. 12: 151. 1908. Based on *Milium pungens* Torr.
Milium pungens Torr. in Spreng., Neu. Entd. 2: 102. 1821. "Schenectady in Massachusetana." [Error for New York.]
Oryzopsis parviflora Nutt., Acad. Nat. Sci. Phila. Jour. 3: 125. 1823. Bellows Falls, Vt.
Panicum firmum Kunth, Rév. Gram. 1: 37. 1829. Based on *Milium pungens* Torr.
Urachne brevicaudata Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 1: 127. 1834. Lake Winnipeg, Canada.
Urachne canadensis Torr. and Gray ex Trin. and Rupr., Acad. St. Pétersb. Mém. VI. Sci. Nat. 5¹: 17. 1842, as synonym of *Urachne brevicaudata* Trin.
- (9) **Oryzopsis racemosa** (J. E. Smith) Ricker in Hitchc., Rhodora 8: 210. 1906. Based on *Milium racemosum* J. E. Smith.
Milium racemosum J. E. Smith, in Rees's Cycl. 23: *Milium* No. 15. 1813. Lancaster, Pa., *Muhlenberg*.
Oryzopsis melanocarpa Muhl., Descr. Gram. 79. 1817. Pennsylvania, *Muhlenberg*. Name only, Muhl., Cat. Pl. 11. 1813.
Piptatherum nigrum Torr., Fl. North. and Mid. U. S. 1: 79. 1823. Williamstown and Deerfield, Mass.; Kingston and Fishkill Mountains, N. Y.; Pennsylvania, *Muhlenberg*.
Urachne racemosa Trin., Gram. Unifl. 174. 1824. Based on *Milium racemosum* J. E. Smith.
Urachne melanosperma Link, Hort. Berol. 1: 94. 1827. Based on *Oryzopsis melanocarpa* Muhl.
Piptatherum racemosum Eaton, Man. ed. 5. 331. 1829. Presumably based on *Milium racemosum* J. E. Smith.
- (11) **Oryzopsis webberi** (Thurb.) Benth. ex Vasey, Grasses U. S. 23. 1883. Based on *Eriocoma webberi* Thurb.
Eriocoma webberi Thurb. in S. Wats., Bot. Calif. 2: 283. 1880. Sierra Valley, Calif., *Bolander*.
Stipa webberi B. L. Johnson, Bot. Gaz. 107: 25. 1945. Based on *Eriocoma webberi* Thurb.

(137) PANICUM L.

- (156) **Panicum abscissum** Swallen, Wash. Acad. Sci. Jour. 30: 215. f. 4. 1940. Sebring, Fla., *Weatherwax* in 1925.

- (14) *Panicum aciculare* Desv. ex Poir. in Lam., Encycl. Sup. 4: 274. 1816. "Indes orientales," erroneous; probably from southeastern United States.
Panicum setaceum Muhl., Descr. Gram. 99. 1817. Georgia. Name only, Muhl., Cat. Pl. 9. 1813.
Panicum subuniflorum Bosc ex Spreng., Syst. Veg. 1: 312. 1825. Carolina, Bosc.
Panicum arenicola Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 56. 1898. Chapel Hill, N. C., Ashe.
Panicum pungens Muhl. ex Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 27: 2. 1900. Not *P. pungens* Poir., 1816. As synonym of *P. setaceum* Muhl.
Panicum filirameum Ashe, Elisha Mitchell Sci. Soc. Jour. 16: 88. 1900. New Hanover County, N. C., Ashe.
This is the species described in Britton's Manual and in Small's Flora (ed. 1) under the name *Panicum neuranthum* Griseb.
- (103) *Panicum aculeatum* Hitchc. and Chase, Rhodora 8: 209. 1906. District of Columbia, Chase 2520.
- (68) *Panicum addisonii* Nash, Torrey Bot. Club Bul. 25: 83. 1898. Wildwood, N. J., Bicknell in 1897.
Panicum owenae Bicknell, Torrey Bot. Club Bul. 35: 185. 1908. Nantucket, Mass., Bicknell in 1907.
Panicum commonsianum subsp. *addisonii* Stone, N. J. State Mus. Ann. Rpt. 1910: 205. 1911. Based on *P. addisonii* Nash.
Panicum commonsianum var. *addisonii* Pohl, Amer. Midl. Nat. 38: 582. 1947. Based on *P. addisonii* Nash.
- (121) *Panicum adpersum* Trin., Gram. Pan. 146. 1826. Dominican Republic.
Panicum thomasianum Steud ex Doell, in Mart., Fl. Bras. 2^e: 188. 1877, as synonym of *P. adpersum*. St. Thomas, Duchassaing.
Panicum keyense Mez, Notizbl. Bot. Gart. Berlin 7: 61. 1917. Sand Key, Fla., Curtiss 3606**, 5431, 6705.
This is the species described as *Panicum striatum* Lam. by Chapman (Fl. South. U. S. ed. 2. 666. 1883).
- (157) *Panicum agrostoides* Spreng., Pl. Pugill. 2: 4. 1815. Pennsylvania, Muhlenberg. Name only, Muhl., Amer. Phil. Soc. Trans. 4: 236. 1799.
Panicum rigidulum Bosc ex Spreng., Syst. Veg. 1: 320. 1825; Nees, Agrost. Bras. 163. 1829. [South Carolina? Bosc.]
Agrostis polystachya Bosc ex Steud., Nom. Bot. ed. 2. 1: 40. 1840, erroneously cited as synonym of *A. composita* Poir. [Carolina, Bosc.]
Panicum elongatum var. *ramosior* Mohr, U. S. Natl. Herb. Contrib. 6: 357. 1901. Near Mobile, Ala. [Mohr].
- PANICUM AGROSTOIDES* var. *RAMOSIUS* (Mohr) Fernald, Rhodora 38: 390. 1936. Based on *P. elongatum* var. *ramosior* Mohr.
- (46) *Panicum albarmarlense* Ashe, Elisha Mitchell Sci. Soc. Jour. 16: 84. 1900. Scranton, Hyde County, N. C., Ashe in 1899.
Panicum velutinum Bosc ex Spreng., Syst. Veg. 1: 315. 1825. Not *P. velutinum* Meyer, 1818. Name only. [Bosc.]
Panicum meridionale var. *albarmarlense* Fernald, Rhodora 36: 76. 1934. Based on *P. albarmarlense* Ashe.
- (77) *Panicum albomarginatum* Nash, Torrey Bot. Club Bul. 24: 40. 1897. Eustis, Fla., Nash 925.
- (154) *Panicum amarulum* Hitchc. and Chase, U. S. Natl. Herb. Contrib. 15: 96. f. 87. 1910. Virginia Beach, Va., Williams 3090.
- (153) *Panicum amarum* Ell., Bot. S. C. and Ga. 1: 121. 1816. Presumably South Carolina.
Panicum amarum var. *minus* Vasey and Scribn., U. S. Dept. Agr., Div. Bot. Bul. 8: 38. 1889. Fortress Monroe, Va., Vasey.
Panicum amaroides Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 29: 5. f. 1. 1901. Based on *P. amarum* var. *minus* Vasey and Scribn.
Chasea amara Nieuwl., Amer. Midl. Nat. 2: 64. 1911. Based on *Panicum amarum* Ell.
- (162) *Panicum anceps* Michx., Fl. Bor. Amer. 1: 48. 1803. Carolina, Michaux.
Panicum rostratum Muhl. in Willd., Enum. Pl. 1032. 1809. Pennsylvania [type, Muhlenberg] and Carolina. Name only, Muhl., Amer. Phil. Soc. Trans. 4: 236. 1799.
Agrostis nutans Poir. in Lam., Encycl. Sup. 1: 255. 1810. Carolina, Bosc.
Vilfa nutans Beauv., Ess. Agrost. 16, 148, 181. 1812. Based on *Agrostis nutans* Poir.
Panicum nutans Desv., Opusc. 93. 1831. Based on *Agrostis nutans* Poir.
Panicum anceps var. *angustum* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 8: 37. 1889. Texas, Nealley.
Panicum anceps var. *densiflorum* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 8: 37. 1889. [Marshall] Tex., Riggs [91].
- (18) *Panicum angustifolium* Ell., Bot. S. C. and Ga. 1: 129. 1816. Presumably South Carolina.
? *Panicum ramulosum* Michx., Fl. Bor. Amer. 1: 50. 1803. Carolina, Michaux.
Panicum nitidum var. *angustifolium* A. Gray, N. Amer. Gram. and Cyp. 2: 112. 1835. Based on *P. angustifolium* Ell.
Panicum curtisii Steud., Syn. Pl. Glum. 1: 66. 1854. South Carolina, M. A. Curtis.
Chasea angustifolia Nieuwl., Amer. Midl.

- Nat. 2: 64. 1911. Based on *Panicum angustifolium* Ell.
- (29) ***Panicum annulum*** Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 58. 1898. Maryland to North Carolina and Georgia, Washington, D. C., Ward in 1892 [type].
Panicum bogueanum Ashe, Elisha Mitchell Sci. Soc. Jour. 16: 85. 1900. Based on *P. annulum* Ashe.
- Panicum antidotale*** Retz., Obs. Bot. 4: 17. 1786. Botanic garden, India.
- (21) ***Panicum arenicoloides*** Ashe, Elisha Mitchell Sci. Soc. Jour. 16: 89. 1900. Wilmington, N. C., Ashe in 1899.
Panicum orthophyllum Ashe, Elisha Mitchell Sci. Soc. Jour. 16: 90. 1900. New Hanover County, N. C., Ashe in 1899.
- (123) ***Panicum arizonicum*** Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 32: 2. 1901. Camp Lowell, Ariz., Pringle 465.
Panicum fuscum var. *majus* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 8: 26. 1889. Mexico [southwestern Chihuahua, Palmer 1b in 1885].
Panicum dissitiflorum Vasey in S. Wats., Amer. Acad. Sci. Proc. 24: 80. 1889. Name only. Guaymas, Mexico, Palmer 159 in part, 190.
Panicum fasciculatum var. *majus* Beal, Grasses N. Amer. 2: 117. 1896. Based on *P. fuscum* var. *majus* Vasey.
Panicum fasciculatum dissitiflorum Vasey ex Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 32: 2. 1901, as synonym of *P. arizonicum*.
Panicum arizonicum var. *tenue* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 32: 3. 1901. Fort Huachuca, Ariz., Wilcox in 1894.
Panicum arizonicum var. *laevigulum* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 32: 3. 1901. Mescal, Ariz., Griffiths 1810.
Panicum arizonicum var. *majus* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 32: 3. 1901. Based on *P. fuscum* var. *majus* Vasey.
- (108) ***Panicum ashei*** Pearson in Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 35. 1898. Ithaca, N. Y., Ashe in 1898.
Panicum umbrosum LeConte ex Torr. in Eaton, Man. Bot. 342. 1818. Not *P. umbrosum* Retz., 1786. New York.
Panicum commutatum var. *ashei* Fernald, Rhodora 36: 83. 1934. Based on *P. ashei* Pearson.
- (51) ***Panicum auburne*** Ashe, N. C. Agr. Expt. Sta. Bul. 175: 115. 1900. Auburn, Ala., Earle and Baker 1527.
- (34) ***Panicum barbulatum*** Michx., Fl. Bor. Amer. 1: 49. 1803. "Carolina" [but type from Canada].
Panicum dichotomum var. *barbulatum* Wood, Class-book ed. 3. 786. 1861.
- Presumably based on *P. barbulatum* Michx.
- Panicum pubescens* var. *barbulatum* Britton, Cat. Pl. N. J. 280. 1889. Presumably based on *P. barbulatum* Michx.
- Panicum nitidum* var. *barbulatum* Chapm., Fl. South. U. S. ed. 3. 586. 1897. Based on *P. barbulatum* Michx.
- Panicum gravius* Hitchc. and Chase, Rhodora 8: 205. 1906. Between Centreville and Mount Cuba, Del., Chase 3620.
- (126) ***Panicum bartowense*** Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 35: 3. 1901. Bartow, Fla., Combs 1220.
Panicum dichotomiflorum var. *bartowense* Fernald, Rhodora 38: 387. 1936. Based on *P. bartowense* Scribn. and Merr.
- (60) ***Panicum benneri*** Fernald, Rhodora 46: 2. pl. 807. 1944. New Jersey, along the Delaware River, Hunterdon County, Benner 9635.
- (15) ***Panicum bennettense*** M. V. Brown, Torrey Bot. Club Bul. 69: 539. f. 1. 1942. North Carolina, at Bennett Memorial, Durham County, M. V. Brown 2492.
- Panicum bergii*** Arech., An. Mus. Nac. Montevideo 1: 147. 1894. Uruguay.
- (24) ***Panicum bicknellii*** Nash, Torrey Bot. Club Bul. 24: 193. 1897. Bronx Park, N. Y., Bicknell in 1895.
Panicum nemopanum Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 42. 1898. Raleigh, N. C., Ashe in 1895.
Panicum bushii Nash, Torrey Bot. Club Bul. 26: 568. 1899. McDonald County, Mo., Bush 413.
Panicum bicknellii var. *bushii* Farwell, Mich. Acad. Sci. Papers 1: 85. 1921. Based on *P. bushii* Nash.
- (32) ***Panicum boreale*** Nash, Torrey Bot. Club Bul. 22: 421. 1895. Cairo, N. Y., Nash in 1893.
Panicum boreale var. *michiganense* Farwell, Rhodora 42: 306. 1940. Detroit, Mich., Farwell 1425.
- (115) ***Panicum boscii*** Poir. in Lam., Encycl. Sup. 4: 278. 1816. Carolina, Bosc.
Panicum waltheri Poir. in Lam., Encycl. Sup. 4: 282. 1816. Not *P. waltheri* Pursh, 1814. Based on *P. latifolium* as described by Michaux.
Panicum latifolium var. *australe* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 8: 34. 1889. Alabama [type, Thomasville, Mohr] to Texas.
Panicum porterianum Nash, Torrey Bot. Club Bul. 22: 420. 1895. Based on *P. waltheri* Poir.
- PANICUM BOSCHII** var. **MOLLE** (Vasey) Hitchc. and Chase in Robinson, Rhodora 10:

64. 1908. Based on *P. latifolium* var. *molle* Vasey.
- Panicum latifolium* var. *molle* Vasey ex Ward, Fl. Washington 135. 1881. District of Columbia, [Ward].
- Panicum walteri* var. *molle* Porter, Torrey Bot. Club Bul. 20: 194. 1893. Presumably based on *P. latifolium* var. *molle* Vasey.
- Panicum pubifolium* Nash, Torrey Bot. Club Bul. 26: 577. 1899. Based on *P. latifolium* var. *molle* Vasey.
- (166) *Panicum brachyanthum* Steud., Syn. Pl. Glum. 1: 67. 1854. [Rusk County] Tex., Vinzent 124.
- Panicum sparsiflorum* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 8: 36. 1889. Not *P. sparsiflorum* Doell, 1877. South Carolina to Texas [type, San Bernardino, Ridell 20].
- This species was described as *Panicum angustifolium* Ell. by Chapman (Fl. South. U. S. 574. 1860).
- (86) *Panicum breve* Hitchc. and Chase, U. S. Natl. Herb. Contrib. 15: 271. f. 301. 1910. Jensen, Fla., Hitchcock 734.
- (148) *Panicum bulbosum* H. B. K., Nov. Gen. et Sp. 1: 99. 1815. Guanajuato, Mexico, Humboldt and Bonpland.
- Panicum avenaceum* H. B. K., Nov. Gen. et Sp. 1: 99. 1815. Ecuador, Humboldt and Bonpland.
- Panicum gongylodes* Jacq., Eclog. Gram. 30. pl. 21. 1815–1820. Cultivated at Vienna.
- Panicum nodosum* Willd. ex Steud., Nom. Bot. ed. 2: 2: 260. 1841, as synonym of *P. bulbosum*.
- Panicum maximum* var. *gongylodes* Doell in Mart., Fl. Bras. 2²: 203. 1877. Based on *P. gongylodes* Jacq.
- Panicum maximum* var. *bulbosum* Vasey in Rothr., in Wheeler, U. S. Survey W. 100th Merid. Rpt. 6: 295. 1878. Presumably based on *P. bulbosum* H. B. K.
- Panicum polygamum* var. *gongylodes* Fourn., Mex. Pl. 2: 28. 1886. Based on *P. gongylodes* Jacq.
- Panicum bulbosum* subvar. *violaceum* Fourn., Mex. Pl. 2: 27. 1886. Chinantla, Mexico, Liebmans 451.
- Panicum bulbosum* var. *avenaceum* Beal, Grasses N. Amer. 2: 132. 1896. Based on *P. avenaceum* H. B. K.
- PANICUM BULBOSUM** var. **MINUS** Vasey, U. S. Dept. Agr., Div. Bot. Bul. 8: 38. 1889. Texas, New Mexico, and Arizona [type New Mexico, Rusby in 1880].
- Panicum sciaphilum* Rupr. in Fourn., Mex. Pl. 2: 19. 1886. Yavesia, Mexico, Galeotti 5759.
- Panicum bulbosum sciaphilum* Hitchc. and Chase, U. S. Natl. Herb. Contrib. 15: 83. f. 73. 1910. Based on *P. sciaphilum* Rupr.
- (37) *Panicum caerulescens* Hack. ex Hitchc., U. S. Natl. Herb. Contrib. 12: 219. 1909. Miami, Fla., Hitchcock 706.
- (25) *Panicum calliphylum* Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 31. 1898. Watkins, N. Y., Ashe in 1898.
- (133) *Panicum capillare* L., Sp. Pl. 58. 1753. Virginia, [Clayton 454].
- Milium capillare* Moench, Meth. Pl. 203. 1794. Based on *P. capillare* L.
- Panicum bobarti* Lam., Encycl. 4: 748. 1798. [Virginia, Bobart.]
- Panicum capillare* var. *agreste* Gattinger, Tenn. Fl. 94. 1887. Tennessee [Ridgetop, Gattinger].
- Panicum capillare* var. *vulgare* Scribn., Tenn. Agr. Expt. Sta. Bul. 7: 44. 1894. Presumably Knoxville, Tenn.
- Chasea capillaris* Nieuwl., Amer. Midl. Nat. 2: 64. 1911. Based on *Panicum capillare* L.
- Leptoloma capillaris* Smyth, Kans. Acad. Sci. Trans. 25: 86. 1913. Based on *Panicum capillare* L.
- PANICUM CAPILLARE** var. **OCCIDENTALE** Rydb., U. S. Natl. Herb. Contrib. 3: 186. 1895. Whitman, Nebr., Rydberg 1788.
- Panicum capillare brevifolium* Vasey ex Rydb. and Shear, U. S. Dept. Agr., Div. Agrost. Bul. 5: 21. 1897. Manhattan, Mont., Shear 436.
- Panicum barbipulvinatum* Nash in Rydb., N. Y. Bot. Gard. Mem. 1: 21. 1900. Based on *P. capillare* var. *brevifolium* Vasey.
- Leptoloma barbipulvinata* Smyth, Kans. Acad. Sci. Trans. 25: 86. 1913. Based on *Panicum barbipulvinatum* Nash.
- Milium barbipulvinatum* Lunell, Amer. Midl. Nat. 4: 212. 1915. Based on *Panicum barbipulvinatum* Nash.
- Panicum barbipulvinatum* var. *hirsutipes* Suksdorf, Werdenda 1: 17. 1927. Spokane, Wash., Suksdorf 9068.
- Panicum elegantulum* Suksdorf, Werdenda 1: 16. 1927. Not *P. elegantulum* Mez, 1917. Spokane, Wash., Suksdorf 9069. (No. 11792, also cited, is *P. capillare*.)
- (139) *Panicum capillarioides* Vasey in Coulter, U. S. Natl. Herb. Contrib. 1: 54. 1890. Point Isabel, Tex., Nealley [634].
- (84) *Panicum chamaelonche* Trin., Gram. Pan. 242. 1826. North America, Enslin.
- Panicum nitidum* var. *minus* Vasey, U. S. Natl. Herb. Contrib. 3: 30. 1892. Florida, [type, St. Augustine, Canby].
- Panicum baldwinii* Nutt. ex Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 1: 21. 1895, name only; Chapm. Fl. South. U. S. ed. 3: 586. 1897. Florida, Baldwin.
- Panicum dichotomum* var. *nitidum* Chapm. ex Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 11: 43. 1898, as synonym of *P. baldwinii*.

- (1) *Panicum chapmani* Vasey, Torrey Bot. Club Bul. 11: 61. 1884. Southern Florida, *Chapman*.
Setaria chapmani Pilger in Engl. and Prantl, Pflanzenfam. ed. 2. 14e: 72. 1940. Based on *Panicum chapmani* Vasey.
 This is the species described as *Panicum tenuiculmum* Meyer by Chapman (Fl. South. U. S. 572. 1860).
- (16) *Panicum chrysopsidifolium* Nash in Small, Fl. Southeast. U. S. 100, 1327. 1903. Leon County, Fla., *Curtiss* (No. D).
- (11) *Panicum ciliatum* Ell., Bot. S. C. and Ga. 1: 126. 1816. Presumably South Carolina.
Panicum leucoblepharis Trin., Clav. Agrost. 234. 1822. North America [type, *Enslin*].
Panicum ciliatifolium Kunth, Rév. Gram. 1: 36. 1829. Based on *P. ciliatum* Ell.
Panicum ciliatifolium Desv., Opusc. 88. 1831. North America.
- (113) *Panicum clandestinum* L., Sp. Pl. 58. 1753. Pennsylvania, *Kalm*.
Milium clandestinum Moench, Meth. Pl. 204. 1794. Based on *Panicum clandestinum* L.
Panicum latifolium var. *clandestinum* Pursh, Fl. Amer. Sept. 1: 68. 1814. Based on *P. clandestinum* L.
Panicum pedunculatum Torr., Fl. North. and Mid. U. S. 141. 1823. "Island of New York."
Panicum clandestinum var. *pedunculatum* Torr., Fl. N. Y. 2: 426. 1843. Based on *P. pedunculatum* Torr.
Panicum decoloratum Nash, Torrey Bot. Club Bul. 26: 570. 1899. Tullytown, Pa., *Bicknell* in 1899.
Chasea clandestina Nieuwl., Amer. Midl. Nat. 2: 64. 1911. Based on *Panicum clandestinum* L.
- (31) *Panicum clutei* Nash, Torrey Bot. Club Bul. 26: 569. 1899. Between Tuckerton and Atsion, N. J., *Clute*.
Panicum mattamuskeetense var. *clutei* Fernald, Rhodora 39: 386. 1937. Based on *P. clutei* Nash.
- (71) *Panicum columbianum* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 7: 78. f. 60. 1897. District of Columbia, *Scribner* in 1894.
Panicum heterophyllum Bosc ex Nees, Agrost. Bras. 227. 1829. Not *P. heterophyllum* Spreng., 1822. North America, *Bosc*.
Panicum psammophilum Nash, Torrey Bot. Club Bul. 26: 576. 1899. Not *P. psammophilum* Welw., 1899. Toms River, N. J., *Clute* 175.
- PANICUM COLUMBIANUM var. THINIUM Hitchc. and Chase in Robinson, Rhodora 10: 64. 1908. Based on *P. unciphyllum thinium* Hitchc. and Chase.
Panicum unciphyllum thinium Hitchc. and Chase, Rhodora 8: 209. 1906. Toms River, N. J., *Chase* 3577.
Panicum heterophyllum var. *thinium* Hubb., Rhodora 14: 172. 1912. Based on *P. unciphyllum thinium* Hitchc. and Chase.
- (161) *Panicum combsii* Scribn. and Ball, U. S. Dept. Agr., Div. Agrost. Bul. 24: 42. f. 16. 1901. Chipley, Fla., *Combs* 583.
Panicum longifolium var. *combsii* Fernald, Rhodora 36: 69. 1934. Based on *P. combsii* Scribn. and Ball.
- (67) *Panicum commonsianum* Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 55. 1898. Cape May, N. J., *Commons* 341.
- (109) *Panicum commutatum* Schult., Mantissa 2: 242. 1824. Based on *P. nervosum* Muhl.
Panicum nitidum var. *majus* Pursh, Fl. Amer. Sept. 1: 67. 1814. North America.
Panicum nervosum Muhl. ex Ell., Bot. S. C. and Ga. 1: 122. 1816. Not *P. nervosum* Lam., 1797. Carolina and Georgia.
Panicum enslini Trin., Gram. Pan. 230. 1826. North America, *Enslin*.
Panicum polyneuron Steud., Syn. Pl. Glum. 1: 91. 1854. Based on *P. nervosum* Muhl.
Panicum commutatum var. *minus* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 8: 34. 1889. Southern States [type, *Aiken*, S. C., *Ravenel*].
Panicum commutatum var. *latifolium* Scribn. in Kearney, Torrey Bot. Club Bul. 20: 476. 1893. Pine Mountain, Ky., *Kearney* 299.
Panicum commelinaefolium Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 29. 1898. Not *P. commelinaefolium* Rudge, 1805. Stone Mountain, Ga., *Small* in 1895.
Panicum currani Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 113. 1899. Based on *P. commelinaefolium* Ashe.
Panicum subsimplex Ashe, N. C. Agr. Expt. Sta. Bul. 175: 115. 1900. Wilmington, Del., *Commons*.
- (80) *Panicum concinnius* Hitchc. and Chase, U. S. Natl. Herb. Contrib. 15: 263. f. 289. 1910. Based on *P. gracilicaule* Nash.
Panicum gracilicaule Nash in Small, Fl. Southeast. U. S. 98. 1903. Not *P. gracilicaule* Rendle, 1899. Sand Mountain, Ala., *Harbison* 2415.
- (158) *Panicum condensum* Nash in Small, Fl. Southeast. U. S. 93. 1903. [Jacksonville], Fla., *Curtiss* 5576.
Agrostis purpurascens Bert. ex Steud., Nom. Bot. ed. 2. 1: 42. 1840. Not *A. purpurascens* Swartz, 1788. Name only. Dominican Republic, *Bertero*, *Balbis*.
Panicum contractum Trin. ex Steud., Nom. Bot. ed. 2. 2: 254. 1841. Name

- only. Guadeloupe and Dominican Republic, *Balbis*.
- Panicum agrostoides* var. *condensum* Fernald, Rhodora 36: 74. 1934. Based on *P. condensum* Nash.
- (17) *Panicum consanguineum* Kunth, Rév. Gram. 1: 36. 1829. Based on *P. villosum* Ell.
- Panicum villosum* Ell., Bot. S. C. and Ga. 1: 124. 1816. Not *P. villosum* Lam., 1791. Presumably South Carolina.
- Panicum commutatum* var. *consanguineum* Beal, Grasses N. Amer. 2: 141. 1896. Based on *P. consanguineum* Kunth.
- Panicum georgianum* Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 36. 1898. Darien Junction, Ga., *Small* in 1895.
- Panicum cahoonianum* Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 113. 1899. Based on *P. georgianum* Ashe.
- (107) *Panicum cryptanthum* Ashe, N. C. Agr. Expt. Sta. Bul. 175: 115. 1900. Wilsons Mills, N. C., *Ashe* in 1897.
- (83) *Panicum curtifolium* Nash, Torrey Bot. Club Bul. 26: 569. 1899. Ocean Springs, Miss., *Tracy* 4598.
- Panicum earlei* Nash, Torrey Bot. Club Bul. 26: 571. 1899. Auburn, Ala., *Earle* and *Baker* 1532.
- Panicum austro-montanum* Ashe, Elisha Mitchell Sci. Soc. Jour. 16: 85. 1900. Northern Alabama and adjacent parts of Tennessee, *Ashe*.
- (66) *Panicum deamii* Hitchc. and Chase in Deam, Ind. Dept. Conserv. Pub. 82: 284. pl. 75. f. 18. 1929. Pine, Lake County, Ind., *Deam* 43287.
- (5) *Panicum depauperatum* Muhl., Descr. Gram. 112. 1817. Pennsylvania, Carolina [type]. Name only, Muhl., Cat. Pl. 9. 1813.
- Panicum strictum* Pursh, Fl. Amer. Sept. 1: 69. 1814. Not *P. strictum* R. Br., 1810. Pennsylvania.
- Panicum rectum* Roem. and Schult., Syst. Veg. 2: 457. 1817. Based on *P. strictum* Pursh.
- Panicum involutum* Torr., Fl. North. and Mid. U. S. 144. 1823. Deerfield, Mass., *Cooley*.
- Panicum muhlenbergii* Spreng., Syst. Veg. 1: 314. 1825. North America. [Type, New Jersey, *Torrey*.]
- Panicum junceum* Trin., Gram. Pan. 220. 1826. North America.
- Panicum sprengelii* Kunth, Rév. Gram. 1: 39. 1829. Based on *P. muhlenbergii* Spreng.
- Panicum depauperatum* var. *involutum* Wood, Class-book ed. 1861. 786. 1861. Based on *P. involutum* Torr.
- ?*Panicum depauperatum* var. *laxum* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 8: 29. 1889. "Virginia, Florida, Texas, Arkansas, Missouri."
- Panicum depauperatum* var. *psilophyllum* Fernald, Rhodora 23: 193. 1921. Canton, Maine, *Parlin* 1957.
- Panicum strictum* var. *psilophyllum* Farwell, Mich. Acad. Sci. Papers 26: 5. 1941. Based on *P. depauperatum* var. *psilophyllum* Fernald.
- (125) *Panicum dichotomiflorum* Michx., Fl. Bor. Amer. 1: 48. 1803. Western Allegheny Mountains, *Michaux*.
- Panicum miliaceum* Walt., Fl. Carol. 72. 1788. Not *P. miliaceum* L., 1753. South Carolina.
- Panicum geniculatum* Muhl., Cat. Pl. 9. 1813. Not Lam. 1798. Based on *P. dichotomiflorum* Michx. Name only, Muhl., Amer. Phil. Soc. Trans. 4: 235. 1799.
- Panicum multiflorum* Poir. in Lam., Encycl. Sup. 4: 282. 1816. Carolina, *Bosc*.
- Panicum brachiatum* Bosc ex Spreng., Syst. Veg. 1: 321. 1825. Not *P. brachiatum* Poir. Bermuda cited [but type probably from South Carolina, *Bosc*].
- Panicum elliottii* Trin. ex Nees, Agrost. Bras. 170. 1829, as synonym of *P. proliferum* Lam. [misapplied to *P. dichotomiflorum*].
- Panicum retrofractum* Delile ex Desv., Opusc. 96. 1831. North America. [Type from Carolina.]
- Panicum proliferum* var. *pilosum* Griseb., Cat. Pl. Cub. 232. 1866. Hanábana, Cuba, *Wright* [186].
- Panicum proliferum* var. *geniculatum* Wood, Amer. Bot. and Flor. pt. 2: 392. 1871. Eastern States.
- Panicum amplexans* Chapm., Bot. Gaz. 3: 20. 1878. South Florida [*Blodgett*].
- Leptoloma dichotomiflora* Smyth, Kans. Acad. Sci. Trans. 25: 86. 1913. Based on *Panicum dichotomiflorum* Michx.
- Panicum dichotomiflorum* var. *geniculatum* Fernald, Rhodora 38: 387. pl. 441. f. 2. 1936. Based on *P. proliferum* var. *geniculatum* Wood.
- Panicum dichotomiflorum* var. *imperialium* Fernald, Rhodora 44: 380. 1942. Greensville County, Va., *Fernald* and *Long* 13877.
- This species has been referred to *P. proliferum* Lam., an Old World species.
- PANICUM DICHOTOMIFLORUM VAR. PURITANORUM Svenson, Rhodora 22: 154. f. 1-5. 1920. Barnstable, Mass., *Fernald* in 1919.
- (33) *Panicum dichotomum* L., Sp. Pl. 58. 1753. Virginia, [*Clayton* 458].
- Panicum angustifolium* LeConte ex Torr. in Eaton, Man. Bot. ed. 2: 342. 1818. Not *P. angustifolium* Ell., 1816. New York.
- Panicum tremulum* Spreng., Neu. Entd. 2: 103. 1821. New Jersey [*Torrey*].
- Panicum dichotomum* var. *viride* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 8: 30. 1889. No locality cited. [Type, Washington, D. C., *Ward* in 1881.]

- Panicum dichotomum* var. *divaricatum* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 8: 30. 1889. No locality cited. [Type, Lake, Miss., Tracy 127.]
- Panicum nitidum* var. *pauciflorum* Britton, N. Y. Acad. Sci. Trans. 9: 14. 1839. Morris County, N. J., Britton.
- Panicum nitidum* var. *viride* Britton, N. Y. Acad. Sci. Trans. 9: 14. 1839. Based on *P. dichotomum* var. *viride* Vasey.
- Panicum dichotomum* var. *commune* Wats. and Coult. in A. Gray, Man. ed. 6: 633. 1890. No locality cited.
- Panicum ramulosum* var. *viride* Porter, Torrey Bot. Club Bul. 20: 194. 1893. Presumably based on *P. dichotomum* var. *viride* Vasey.
- Chasea dichotoma* Nieuwl., Amer. Midl. Nat. 2: 64. 1911. Based on *Panicum dichotomum* L.
- (81) *Panicum ensifolium* Baldw. ex Ell., Bot. S. C. and Ga. 1: 126. 1816. Georgia, Baldwin.
- Panicum nitidum* var. *ensifolium* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 8: 29. 1889. Based on *P. ensifolium* Baldw.
- Panicum brittoni* Nash, Torrey Bot. Club Bul. 24: 194. 1897. Forked River, N. J., Britton in 1896.
- Panicum cuthbertii* Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 48. 1898. St. Helena Island, S. C., Cuthbert.
- Panicum glaberrimum* Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 62. 1898. Manteo, N. C., Ashe in 1898.
- Panicum shallotte* Ashe, Elisha Mitchell Sci. Soc. Jour. 16: 84. 1900. Based on *P. glaberrimum* Ashe.
- Panicum parvipaniculatum* Ashe, Elisha Mitchell Sci. Soc. Jour. 16: 87. 1900. Onslow County, N. C., Ashe in 1899.
- (112) *Panicum equilaterale* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 11: 42. pl. 2. 1893. Eustis, Fla., Nash 1674.
- Panicum epilifolium* Nash, Torrey Bot. Club Bul. 26: 571. 1899. Eustis, Fla., Nash 45.
- (75) *Panicum erectifolium* Nash, Torrey Bot. Club Bul. 23: 148. 1896. Based on *P. sphaerocarpon* var. *floridanum* Vasey.
- Panicum sphaerocarpon* var. *floridanum* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 8: 33. 1889. Not *P. floridanum* Trin., 1834. Florida [type, Mosquito Inlet, Curtiss 3599].
- Panicum floridanum* Chapm., Fl. South. U. S. ed. 3. 585. 1897. Not *P. floridanum* Trin., 1834. Presumably based on *P. sphaerocarpon* var. *floridanum* Vasey.
- (120) *Panicum fasciculatum* Swartz, Prodr. Veg. Ind. Occ. 22. 1788. Jamaica, Swartz.
- Panicum chartaginense* Swartz, Prodr. Veg. Ind. Occ. 22. 1788. Cartagena, Colombia.
- Panicum fuscum* Swartz, Prodr. Veg. Ind. Occ. 23. 1788. Jamaica, Swartz.
- Panicum flavescens* Swartz, Prodr. Veg. Ind. Occ. 23. 1788. Jamaica, Swartz.
- Panicum fusco-rubens* Lam., Tabl. Encycl. 1: 171. 1791. West Indies.
- Panicum fastigiatum* Poir. in Lam., Encycl. Sup. 4: 277. 1816. Based on *P. fasciculatum* Swartz.
- Panicum spithamaeum* Willd. ex Nees, Agrost. Bras. 152. 1829. Name only. South America, Humboldt.
- Panicum illinoiense* Desv., Opusc. 91. 1831. North America.
- Panicum reticulatum* Griseb., Abhandl. Gesell. Wiss. Göttingen 7: 264. 1857. Not *P. reticulatum* Torr. 1852. West Indies or Panama.
- Panicum fuscum* var. *fasciculatum* Griseb., Fl. Brit. W. Ind. 547. 1864. Based on *P. fasciculatum* Swartz.
- Panicum fasciculatum* var. *flavescens* Doell in Mart., Fl. Bras. 2²: 205. 1877. Based on *P. flavescens* Swartz.
- Panicum fasciculatum* var. *fuscum* Doell in Mart., Fl. Bras. 2²: 205. 1877. Based on *P. fuscum* Swartz.
- Panicum fasciculatum* var. *chartaginense* Doell in Mart., Fl. Bras. 2²: 205. 1877. Based on *P. chartaginense* Swartz.
- PANICUM FASCICULATUM VAR. RETICULATUM (Torr.) Beal, Grasses N. Amer. 2: 117. 1896. Based on *P. reticulatum* Torr.
- Panicum reticulatum* Torr. in Marcy, Expl. Red Riv. 299. 1852. Red River, Tex.
- Panicum fuscum reticulatum* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 32: 4. 1901. Based on *P. reticulatum* Torr.
- (140) *Panicum filipes* Scribn. in Heller, Herb. Frankl. Marsh. Col. Contrib. 1: 13. 1895. Corpus Christi, Tex., Heller 1809.
- (4) *Panicum firmulum* Hitchc. and Chase, U. S. Natl. Herb. Contrib. 15: 27. f. 9. 1910. El Sordo, Tex., Griffiths 6446.
- Setaria firmula* Pilger in Engl. and Prantl, Pflanzenfam. ed. 2. 14e: 72. 1940. Based on *Panicum firmulum* Hitchc. and Chase.
- (79) *Panicum flavovirens* Nash, Torrey Bot. Club Bul. 26: 572. 1899. Lake County, Fla., Nash 2061.
- (128) *Panicum flexile* (Gattinger) Scribn. in Kearney, Torrey Bot. Club Bul. 20: 476. 1893. Based on *P. capillare* var. *flexile* Gattinger.
- Panicum capillare* var. *flexile* Gattinger, Tenn. Fl. 94. 1887. [Nashville, Tenn., Gattinger.]
- Chasea flexilis* Nieuwl., Amer. Midl. Nat. 2: 65. 1911. Based on *Panicum flexile* Scribn.
- (20) *Panicum fusiforme* Hitchc., U. S. Natl. Herb. Contrib. 12: 222. 1909.

- Based on *P. neuranthum* var. *ramosum* Griseb.
- Panicum neuranthum* var. *ramosum* Griseb., Cat. Pl. Cub. 232. 1866. Not *P. ramosum* L., 1767. Western Cuba, Wright 3454.
- (129) *Panicum gattingeri* Nash in Small, Fl. Southeast. U. S. 92, 1327. 1903. Based on *P. capillare* var. *campestre* Gattinger.
- Panicum capillare* var. *campestre* Gattinger, Tenn. Fl. 94. 1887. Not *P. campestre* Nees. [Nashville, Tenn., Gattinger.]
- Panicum capillare* var. *geniculatum* Scribn. in Kearney, Torrey Bot. Club Bul. 20: 477. 1893. Wasioto, Ky., [Kearney 378].
- Panicum capillare gattingeri* Nash in Britt. and Brown, Illustr. Fl. 1: 123. 1896. Based on *P. capillare* var. *campestre* Gattinger.
- (116) *Panicum geminatum* Forsk., Fl. Aegypt. Arab. 18. 1775. Rosetta, Egypt.
- Paspalum appressum* Lam., Tabl. Encycl. 1: 176. 1791. South America.
- Digitaria appressa* Pers., Syn. Pl. 1: 85. 1805. Based on *Paspalum appressum* Lam.
- Panicum beckmanniaeforme* Mikan ex Trin. in Spreng., Neu. Entd. 2: 83. 1821. Brazil.
- Panicum brizaeforme* Presl, Rel. Haenk. 1: 302. 1830. Luzon.
- Panicum glomeratum* Buckl., Prel. Rpt. Geol. Agr. Survey Tex. App. 3. 1866. Not *P. glomeratum* Moench, 1794. Western Texas.
- Panicum appressum* Lam. ex Doell, in Mart., Fl. Bras. 2: 184. 1877. Not *P. appressum* Forsk., 1775. Based on *Paspalum appressum* Lam.
- Paspalidium geminatum* Stapf in Prain, Fl. Trop. Afr. 9: 583. 1920. Based on *P. geminatum* Forsk.
- This species has been referred to *Panicum paspalodes* Pers., an Old World species, probably a synonym of *P. punctatum* Burm.
- (143) *Panicum ghiesbreghtii* Fourn., Mex. Pl. 2: 29. 1886. Mexico, Ghiesbreght.
- Panicum hirtivaginum* Hitchc., U. S. Natl. Herb. Contrib. 12: 223. 1909. Cuba, Wright 758.
- (85) *Panicum glabrifolium* Nash, Torrey Bot. Club Bul. 24: 196. 1897. Tampa, Fla., Nash 2415a.
- (150) *Panicum gouini* Fourn., Mex. Pl. 2: 28. 1886. Vera Cruz, Mexico, Gouin 4.
- Panicum gouini* var. *pumilum* Fourn., Mex. Pl. 2: 28. 1886. Mexico, Vera Cruz, Virlet 1300; Antigua, Liebmann 450.
- Panicum repens* var. *confertum* Vasey, Torrey Bot. Club Bul. 13: 25. 1886. "Louisiana" [erroneous, type from Bay St. Louis, Miss., Langlois].
- Panicum halophilum* Nash in Lloyd and Tracy, Torrey Bot. Club Bul. 28: 86. 1901. Based on *P. repens* var. *confertum* Vasey.
- (170) *Panicum gymnocarpon* Ell., Bot. S. C. and Ga. 1: 117. 1816. Savannah, Ga., Baldwin.
- Panicum monachnoides* Desv., Opusc. 86. 1831. "Brazil" [locality erroneous].
- Panicum drummondii* Nees in Steud., Syn. Pl. Glum. 1: 63. 1854. New Orleans, La., Drummond [574].
- Phanopyrum gymnocarpon* Nash in Small, Fl. Southeast. U. S. 104. 1903. Based on *Panicum gymnocarpon* Ell.
- (141) *Panicum hallii* Vasey, Torrey Bot. Club Bul. 11: 61. 1884. Austin, Tex., Hall 816 (in part).
- Panicum virletii* Fourn., Mex. Pl. 2: 29. 1886. San Luis Potosí, Mexico, Virlet 1305, 1371.
- (152) *Panicum havardii* Vasey, Torrey Bot. Club Bul. 14: 95. 1887. Described from type of *P. virgatum* var. *macranthum* Vasey.
- Panicum virgatum* var. *macranthum* Vasey, Torrey Bot. Club Bul. 13: 26. 1886. Not *P. macranthum* Trin., 1826. Guadalupe Mountains, Tex., Havard.
- (94) *Panicum helleri* Nash, Torrey Bot. Club Bul. 26: 572. 1899. Kerrville, Tex., Heller 1759.
- Panicum pernerosum* Nash, Torrey Bot. Club Bul. 26: 576. 1899. Houston, Tex., Hall 830.
- Panicum oligosanthos* var. *helleri* Fernald, Rhodora 36: 80. 1934. Based on *P. helleri* Nash.
- (169) *Panicum hemitomom* Schult., Mantissa 2: 227. 1824. Based on *P. walteri* Muhl.
- Panicum dimidiatum* Walt., Fl. Carol. 72. 1788. Not *P. dimidiatum* L., 1753. South Carolina. Referred by Elliott to *P. walteri*.
- Panicum walteri* Ell., Bot. S. C. and Ga. 1: 115. 1816. Not *P. walteri* Pursh, 1814. Charleston, S. C.; Savannah, Ga., [type].
- Panicum walteri* Muhl., Descr. Gram. 108. 1817. Not *P. walteri* Pursh, 1814. No locality cited, probably Georgia.
- Panicum carolinianum* Spreng., Syst. Veg. 1: 310. 1825. Based on *P. walteri* Ell.
- Oplismenus walteri* Kunth, Rév. Gram. 1: 45. 1829. Based on *Panicum walteri* Muhl.
- Panicum carinatum* Torr. in Curtis, Bost. Jour. Nat. Hist. 1: 137. 1835. Not *P. carinatum* Presl, 1830. [Wilmington] N. C. [M. A. Curtis].
- Panicum digitarioides* Carpenter ex Curtis, Amer. Jour. Sci. (II) 7: 410. 1849, not *P. digitarioides* Raspail, 1833, as synonym of *P. carinatum* Torr.; Steud., Syn. Pl. Glum. 1: 75. 1854. North America [type, Louisiana, Carpenter].

- Panicum curtisii* Chapm., Fl. South. U. S. 573. 1860. Not *P. curtisii* Steud., 1854. Based on *P. walteri* Ell.
- Oplismenus colonum* var. *walteri* Fourn., Mex. Pl. 2: 40. 1886. Based on *O. walteri* Kunth.
- Brachiaria digitarioides* Nash in Britton, Man. 77. 1901. Based on *P. digitarioides* Carpenter.
- (164) *Panicum hians* Ell., Bot. S. C. and Ga. 1: 118. 1816. Charleston, S. C. *Panicum oblongiflorum* Desv., Opusc. 89. 1831. Carolina, Bosc.
- Panicum jejunum* Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 2¹: 103. 1836. Louisiana.
- Aira incompleta* Bosc ex Steud., Nom. Bot. ed. 2. 1: 45. 1840. Name only. [Carolina, Bosc.]
- Steinchisma hians* Nash in Small, Fl. Southeast. U. S. 105. 1903. Based on *Panicum hians* Ell. This name, credited to Raf., is listed in Index Kewensis (2: 982. 1895.) as synonym of *Panicum debile* [Poir.] which is *Festuca obtusa*.
- (134) *Panicum hillmani* Chase, Wash. Acad. Sci. Jour. 14: 345. f. 1. 1934. Amarillo, Tex., Hitchcock 16206.
- (144) *Panicum hirsutum* Swartz, Fl. Ind. Occ. 1: 173. 1797. Jamaica, Hispaniola, Swartz.
- Panicum elatum* Willd. ex Steud., Nom. Bot. ed. 2. 2: 256. 1841. Name only. South America, Humboldt.
- (135) *Panicum hirticaule* Presl, Rel. Haenk. 1: 308. 1830. Acapulco, Mexico, Haenke.
- Panicum flabellatum* Fourn., Soc. Bot. France Bul. II. 27: 293. 1880. Omotepé Island, Nicaragua, Lévy 1166.
- Panicum polygamum* var. *hirticaule* Fourn., Mex. Pl. 2: 28. 1886. Based on *P. hirticaule* Presl, but misapplied to *P. maximum* Jacq.
- Panicum capillare* var. *glabrum* Vasey ex T. S. Brandeg., Proc. Calif. Acad. II. 2: 211. 1889. Name only. Baja California, Brandege in 1889.
- Panicum capillare* var. *hirticaule* Gould, Madroño 10: 94. 1949. Based on *P. hirticaule* Presl.
- (48) *Panicum huachucae* Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 51. 1898. Huachuca Mountains, Ariz., Lemmon in 1882.
- Panicum nitidum* var. *pilosum* Torr., Fl. North. and Mid. U. S. 146. 1824. Not *P. pilosum* Swartz. New York.
- Panicum lanuginosum* var. *huachucae* Hitchc., Rhodora 8: 203. 1906. Based on *P. huachucae* Ashe.
- Panicum lindheimeri* var. *fasciculatum* subvar. *pilosum* Farwell, Amer. Midl. Nat. 11: 45. 1928. New York.
- Panicum lanuginosum* var. *fasciculatum* subvar. *pilosum* Farwell, Mich. Acad. Sci. Papers 26: 5. 1941. Based on *P. nitidum* var. *pilosum* Torr.
- PANICUM HUACHUCAE** var. **FASCICULATUM** (Torr.) Hubb., Rhodora 14: 171. 1912. Based on *P. dichotomum* var. *fasciculatum* Torr.
- Panicum dichotomum* var. *fasciculatum* Torr., Fl. North. and Mid. U. S. 145. 1824. New Jersey.
- Panicum nitidum* var. *ciliatum* Torr., Fl. North. and Mid. U. S. 146. 1824. New Jersey.
- Panicum huachucae* var. *silvicola* Hitchc. and Chase in Robinson, Rhodora 10: 64. 1908. District of Columbia, Chase 2400.
- Panicum lindheimeri* var. *fasciculatum* Fernald, Rhodora 23: 228. 1921. Based on *P. dichotomum* var. *fasciculatum* Torr.
- Panicum lanuginosum* var. *fasciculatum* Fernald, Rhodora 36: 77. 1934. Based on *P. dichotomum* var. *fasciculatum* Torr.
- Panicum glutinoscabrum* Fernald, Rhodora 49: 122. pl. 1059. 1947. Nansemond County, Va., Fernald, Long, and Clement 15186.
- (47) *Panicum implicatum* Scribn. in Britt. and Brown, Illustr. Fl. 3: 498. f. 267a. 1898. Cape Elizabeth, Maine, Scribner in 1895.
- Panicum unciphyllum implicatum* Scribn. and Merr., Rhodora 3: 123. 1901. Based on *P. implicatum* Scribn.
- Panicum lindheimeri* var. *implicatum* Fernald, Rhodora 23: 228. 1921. Based on *P. implicatum* Scribn.
- Panicum lanuginosum* var. *implicatum* Fernald, Rhodora 36: 77. 1934. Based on *P. implicatum* Scribn.
- (111) *Panicum jorii* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 8: 31. 1889. Louisiana, Joor.
- Panicum leiophyllum* Fourn., Mex. Pl. 2: 20. 1886. Not *P. leiophyllum* Nees, 1829. Córdoba, Mexico, Bourgeau.
- Panicum manatense* Nash, Torrey Bot. Club Bul. 24: 42. 1897. Manatee County, Fla., Nash 2428a.
- Panicum commutatum* var. *joorii* Fernald, Rhodora 39: 388. 1937. Based on *P. jorii* Vasey.
- (127) *Panicum lacustre* Hitchc. and Ekman, U. S. Dept. Agr. Misc. Pub. 243: 253. f. 205. 1936. Pinar del Rio, Cuba, Ekman 17878.
- (88) *Panicum lancearium* Trin., Gram. Pan. 223. 1826. North America, Enslin.
- Panicum nashianum* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 7: 79. f. 61. 1897. Eustis, Fla., Nash 466.
- (58) *Panicum languidum* Hitchc. and Chase, U. S. Natl. Herb. Contrib. 15: 232. f. 245. 1910. Based on *P. unciphyllum* forma *prostratum* Scribn. and Merr.
- Panicum unciphyllum* forma *prostratum*

- Scribn. and Merr., *Rhodora* 3: 124. 1901. Not *P. prostratum* Lam., 1791. South Berwick, Maine, *Fernald* in 1897.
- (50) *Panicum lanuginosum* Ell., Bot. S. C. and Ga. 1: 123. 1816. Georgia, *Baldwin*.
Panicum dichotomum var. *lanuginosum* Wood, Class-book ed. 3. 786. 1861. Presumably based on *P. lanuginosum* Ell.
Panicum orangense Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 113. 1899. Orange County, N. C., *Ashe* in 1898.
Panicum ciliosum Nash, Torrey Bot. Club Bul. 26: 568. 1899. Biloxi, Miss., *Tracy* 4580.
- (114) *Panicum latifolium* L., Sp. Pl. 58. 1753. America.
Milium latifolium Moench, Meth. Pl. 204. 1794. Based on *P. latifolium* L.
Panicum macrocarpon LeConte ex Torr. in Eaton, Man. Bot. ed. 2: 341. 1818. New York.
Panicum schneckii Ashe, N. C. Agr. Expt. Sta. Bul. 175: 116. 1900. Southern Indiana and Illinois [*Schneck*].
- (9) *Panicum laxiflorum* Lam., Encycl. 4: 748. 1798. North America.
Panicum dichotomum var. *laxiflorum* Beal, Grasses N. Amer. 2: 139. 1896. Based on *Panicum laxiflorum* Lam.
Panicum pyriforme Nash, Torrey Bot. Club Bul. 26: 579. 1899. Orange Bend, Fla., *Nash* 239.
Panicum aureum Muhl. ex Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 27: 4. 1900, as synonym of *P. laxiflorum* Lam.
- (98) *Panicum leibergii* (Vasey) Scribn. in Britt. and Brown, Illustr. Fl. 3: 497. 1898. Based on *P. scoparium* var. *leibergii* Vasey.
Panicum scoparium var. *leibergii* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 8: 32. 1889. Plymouth County, Iowa, *Leiberg*.
Panicum scribnerianum var. *leibergii* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 6: 32. 1897. Presumably based on *P. scoparium* var. *leibergii* Vasey.
Milium leibergii Lunell, Amer. Midl. Nat. 4: 213. 1915. Based on *Panicum scoparium* var. *leibergii* Vasey.
- (142) *Panicum lepidulum* Hitchc. and Chase, U. S. Natl. Herb. Contrib. 15: 75. f. 64. 1910. Chihuahua, Mexico, *Pringle* 497.
- (42) *Panicum leucothrix* Nash, Torrey Bot. Club Bul. 24: 41. 1897. Eustis, Fla., *Nash* 1338.
Panicum parvispiculum Nash, Torrey Bot. Club Bul. 24: 347. 1897. Darien Junction, Ga., *Small* in 1895.
- (41) *Panicum lindheimeri* Nash, Torrey Bot. Club Bul. 24: 196. 1897. [New Braunfels] Tex., *Lindheimer* 565.
Panicum funstoni Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 35: 4. 1901. Three Rivers, Calif., *Coville* and *Funston* 1286.
- Panicum lindheimeri* var. *typicum* Fernald, *Rhodora* 23: 227. 1921. Based on *P. lindheimeri* Nash.
Panicum lanuginosum var. *lindheimeri* Fernald, *Rhodora* 36: 77. 1934. Based on *P. lindheimeri* Nash.
- (7) *Panicum linearifolium* Scribn. in Britt. and Brown, Illustr. Fl. 3: 500. f. 268a. 1898. New York and New Jersey to Missouri. [Type, Washington, D. C., *Vasey* in 1882.]
Panicum strictum var. *linearifolium* Farwell, Amer. Midl. Nat. 11: 44. 1928. Based on *P. linearifolium* Scribn.
- (131) *Panicum lithophilum* Swallen, Biol. Soc. Wash. Proc. 54: 43. 1941. Stone Mountain, Ga., *Hitchcock* (Amer. Gr. Natl. Herb. No. 24) as "*Panicum philadelphicum*."
- (160) *Panicum longifolium* Torr., Fl. North. and Mid. U. S. 149. 1824. New Jersey, *Goldy*.
Panicum anceps var. *pubescens* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 8: 37. 1889. Mobile, Ala., *Mohr*.
Panicum pseudanceps Nash, Torrey Bot. Club Bul. 25: 85. 1898. Florida, *Simpson* in 1889.
Panicum longifolium var. *pubescens* Fernald, *Rhodora* 36: 69. 1934. Based on *P. anceps* var. *pubescens* Vasey.
- (43) *Panicum longiligulatum* Nash, Torrey Bot. Club Bul. 26: 574. 1899. Apalachicola, Fla., *Vasey* in 1892.
- (38) *Panicum lucidum* Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 47. 1898. Lake Mattamuskeet, N. C., *Ashe* in 1898.
Panicum taxodiorum Ashe, Elisha Mitchell Sci. Soc. Jour. 16: 91. 1900. Lake Charles, La., *Mackenzie* 460.
- PANICUM LUCIDUM var. OPACUM Fernald, *Rhodora* 39: 386. 1937. Prince George County, Va., *Fernald* and *Long* 6484.
- (65) *Panicum malacon* Nash, Torrey Bot. Club Bul. 24: 197. 1897. Eustis, Fla., *Nash* 628.
Panicum strictifolium Nash, Torrey Bot. Club Bul. 26: 579. 1899. Eustis, Fla., *Nash* 603.
- (93) *Panicum malacophyllum* Nash, Torrey Bot. Club Bul. 24: 198. 1897. Sapulpa, Indian Territory [Okla.], *Bush* 1228.
Panicum scoparium var. *minus* Scribn., Tenn. Agr. Expt. Sta. Bul. 7: 48. 1894. Tennessee, *Gattinger*.
- (30) *Panicum mattamuskeetense* Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 45. 1898. Lake Mattamuskeet, N. C., *Ashe* and *Pearson* in 1898.
? *Panicum barbatum* LeConte ex Torr., in Eaton, Man. Bot. ed. 2. 342. 1818. Not *P. barbatum* Lam., 1791. New York.
? *Panicum nitidum* var. *barbatum* Torr.,

- Fl. North. and Mid. U. S. 146. 1824. No locality cited.
- Panicum flexuosum* Muhl. ex Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 27: 3. 1900. Not *P. flexuosum* Retz., 1791. Name only for specimen in Muhlenberg Herb. (See "(174)" Hitchcock, *Bartonia* 14: 39. 1932.)
- (146) *Panicum maximum* Jacq., Col. Bot. 1: 76. 1786. Guadeloupe.
- Panicum polygamum* Swartz, Prodr. Veg. Ind. Occ. 24. 1788. Not *P. polygamum* Forsk., 1775. [Jamaica, Swartz.]
- Panicum laeve* Lam., Tabl. Encycl. 1: 172. 1791. Dominican Republic.
- Panicum jumentorum* Pers., Syn. Pl. 1: 83. 1805. Based on *P. polygamum* Swartz.
- Panicum scaberrimum* Lag., Gen. et Sp. Nov. 2. 1816. Mexico, *Sessé*.
- Panicum trichocondylum* Steud., Syn. Pl. Glum. 1: 74. 1854. Guadeloupe, *Duchassaing*.
- Panicum praticola* Salzm. ex Doell in Mart., Fl. Bras. 2: 203. 1877, as synonym of *P. maximum*. Bahia, Brazil, *Salzmann* 683.
- (45) *Panicum meridionale* Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 59. 1898. Chapel Hill and Burke County, N. C., *Ashe*.
- Panicum filiculme* Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 59. 1898. Not *P. filiculme* Hack., 1895. Chapel Hill, N. C., *Ashe* in 1898; Stone Mountain, Ga., *Small* in 1895.
- ?*Panicum microphyllum* Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 61. 1898. Chapel Hill, N. C., *Ashe* in 1898.
- Panicum unciphyllum meridionale* Scribn. and Merr., Rhodora 3: 123. 1901. Based on *P. meridionale* Ashe.
- Panicum lindheimeri* var. *implicatum* subvar. *meridionale* Farwell, Amer. Midl. Nat. 11: 45. 1928. Based on *P. meridionale* Ashe.
- Panicum lanuginosum* var. *implicatum* subvar. *meridionale* Farwell, Mich. Acad. Sci. Papers 26: 5. 1941. Based on *P. meridionale* Ashe.
- (27) *Panicum microcarpon* Muhl. ex Ell., Bot. S. C. and Ga. 1: 127. 1816. [Georgia, *Baldwin*.]
- Panicum heterophyllum* Muhl., Amer. Phil. Soc. Trans. 3: 160. 1793. Name only.
- Panicum nitidum* var. *ramulosum* Torr., Fl. North. and Mid. U. S. 146. 1824. Quaker Bridge, N. J.
- (138) *Panicum miliaceum* L., Sp. Pl. 58. 1753. India.
- Milium panicum* Mill., Gard. Diet. Milium No. 1. 1768. Based on *Panicum miliaceum* L.
- Milium esculentum* Moench, Meth. Pl. 203. 1794. Based on *Panicum miliaceum* L.
- Panicum milium* Pers., Syn. Pl. 1: 83. 1805. Based on *P. miliaceum* L.
- Leptoloma miliacea* Smyth, Kans. Acad. Sci. Trans. 25: 86. 1913. Based on *Panicum miliaceum* L.
- (105) *Panicum mundum* Fernald, Rhodora 38: 392. pl. 443. f. 1-5. 1936. Homeville, Va., *Fernald* and *Long* 6499.
- (110) *Panicum mutabile* Scribn. and Smith ex Nash in Small, Fl. Southeast. U. S. 103. 1903. Biloxi, Miss., *Tracy* 3074.
- (23) *Panicum neuranthum* Griseb., Cat. Pl. Cub. 232. 1866. Eastern Cuba, *Wright* 3453.
- (28) *Panicum nitidum* Lam., Tabl. Encycl. 1: 172. 1791. Carolina, *Fraser*.
- Panicum nodiflorum* Lam., Encycl. 4: 744. 1798. Carolina, *Fraser*; South Carolina, *Michaux*.
- Panicum dichotomum* var. *nitidum* Wood, Class-book ed. 1861. 786. 1861. Presumably based on *P. nitidum* Lam.
- Panicum dichotomum* var. *nodiflorum* Griseb., Cat. Pl. Cub. 234. 1866. Based on *P. nodiflorum* Lam.
- Panicum subbarbulatum* Scrib. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 29: 9. 1901. Based on *P. barbulatum* Michx. as described by Elliott, not Michaux's species. Presumably South Carolina.
- (101) *Panicum nodatum* Hitchc. and Chase, U. S. Natl. Herb. Contrib. 15: 293. 1910. Sarita, Tex., *Hitchcock* 3865.
- (26) *Panicum nudicaule* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 8: 31. 1889. Santa Rosa County, Fla., *Curtiss* [3583*].
- (168) *Panicum obtusum* H. B. K., Nov. Gen. et Sp. 1: 98. 1815. Near Guanaajuato, Mexico, *Humboldt* and *Bonpland*.
- Panicum polygonoides* C. Muell., Bot. Ztg. 19: 323. 1861. Not *P. polygonoides* Lam., 1798. Texas, *Drummond* 371.
- Panicum repente* Buckl., Prel. Rpt. Geol. Agr. Survey Tex. App. 3. 1866. Texas [Buckley].
- Brachiaria obtusa* Nash in Britton, Man. 77. 1901. Based on *Panicum obtusum* H. B. K.
- (55) *Panicum occidentale* Scribn., Mo. Bot. Gard. Rpt. 10: 48. 1899. Nootka Sound, Vancouver Island, *Haenke*.
- Panicum dichotomum* var. *pubescens* Munro ex Benth., Pl. Hartw. 341. 1857. Name only. Sacramento, Calif., *Hartweg* 2024 (344).
- Panicum brodiei* St. John, Fl. Southeast. Wash. and Adj. Idaho 51. 1937. Wawawai, Wash., *Brodie* in 1898.
- (96) *Panicum oligosanthos* Schult., Mantissa 2: 256. 1824. Based on *P. pauciflorum* Ell.
- Panicum pauciflorum* Ell., Bot. S. C. and Ga. 1: 120. 1816. Not *P. pauciflorum* R. Br., 1810. Georgia.
- Panicum scoparium* var. *angustifolium*

- Vasey, U. S. Dept. Agr., Div. Bot. Bul. 8: 32. 1889. South Carolina, *Ravenel*.
Panicum scoparium var. *pauciflorum* Scribn., Tenn. Agr. Expt. Sta. Bul. 7: 48. 1894. Based on *P. pauciflorum* Ell.
- (72) *Panicum oricola* Hitchc. and Chase, *Rhodora* 8: 208. 1906. Lewes, Del., *Hitchcock* 47.
Panicum columbianum var. *oricola* Fernald, *Rhodora* 36: 79. 1934. Based on *P. oricola* Hitchc. and Chase.
- (62) *Panicum ovale* Ell., Bot. S. C. and Ga. 1: 123. 1816. St. Marys, Ga., *Baldwin*.
Panicum ciliiferum Nash, *Torrey Bot. Club Bul.* 24: 195. 1897. Eustis, Fla., *Nash* 147.
Panicum erythrocarpon Ashe, *Elisha Mitchell Sci. Soc. Jour.* 16: 90. 1900. New Hanover County, N. C., *Ashe* in 1899.
- (22) *Panicum ovinum* Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Cir. 16: 3. 1899. Waller County, Tex., *Thurrow*.
Panicum redivivum Trin. ex Steud., *Nom. Bot. ed. 2. 2: 262.* 1841. Name only. [Jalapa], Mexico, *Schiede*.
- (56) *Panicum pacificum* Hitchc. and Chase, U. S. Natl. Herb. Contrib. 15: 229. f. 241. 1910. Castle Crags, Calif., *Hitchcock* 3070.
- (117) *Panicum paludivagum* Hitchc. and Chase, U. S. Natl. Herb. Contrib. 15: 32. f. 13. 1910. Eustis, Fla., *Nash* 746.
Paspalidium paludivagum Parodi, *Gram. Bonar. ed. 3. 89.* 1939. Based on *Panicum paludivagum* Hitchc. and Chase.
- (136) *Panicum pampinosum* Hitchc. and Chase, U. S. Natl. Herb. Contrib. 15: 66. f. 48. 1910. Wilmot, Ariz., *Thornber* 193.
Panicum capillare var. *pampinosum* Gould, *Madroño* 10: 94. 1949. Based on *P. pampinosum* Hitchc. and Chase.
- (91) *Panicum patentifolium* Nash, *Torrey Bot. Club Bul.* 26: 574. 1899. Eustis, Fla., *Nash* 72.
- (89) *Panicum patulum* (Scribn. and Merr.) Hitchc., *Rhodora* 8: 209. 1906. Based on *P. nashianum* var. *patulum* Scribn. and Merr.
Panicum nashianum var. *patulum* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 27: 9. 1900. "Braidentown" (Bradenton), Fla., *Combs* 1296.
Panicum lancearium var. *patulum* Fernald, *Rhodora* 36: 80. 1934. Based on *P. nashianum* var. *patulum* Scribn. and Merr.
- (100) *Panicum pedicellatum* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 8: 28. 1889. [Kimble County] Tex., *Reverchon*.
- (6) *Panicum perlongum* Nash, *Torrey Bot. Club Bul.* 26: 575. 1899. Creek Nation, Okla., *Carleton* 98.
Panicum pammeli Ashe, N. C. Agr. Expt. Sta. Bul. 175: 116. 1900. Iowa [*Cratty* in 1881].
- Panicum strictum* var. *perlongum* Farwell, *Amer. Midl. Nat.* 11: 44. 1928. Based on *P. perlongum* Nash.
- (130) *Panicum philadelphicum* Bernh. ex Trin., *Gram. Pan.* 216. 1826; Nees, *Agrost. Bras.* 198. 1829. [Philadelphia, Pa., *Bernhardi*.]
Panicum capillare var. *sylvaticum* Torr., *Fl. North. and Mid. U. S.* 149. 1824. Not *P. sylvaticum* Lam., 1798. New York City.
Panicum torreyi Fourn. in Hemsl., *Biol. Centr. Amer. Bot.* 3: 497. 1885. Based on *P. capillare* var. *sylvaticum* Torr.
Panicum capillare var. *minimum* Engelm. ex Gattinger, *Tenn. Fl.* 94. 1887. [Green Brier, Tenn., *Gattinger*.]
Panicum minus Nash, *Torrey Bot. Club Bul.* 22: 421. 1895. Based on "*Panicum capillare* var. *minus* Muhl."
- Panicum capillare* var. *minus* Muhl. ex Nash, *Torrey Bot. Club Bul.* 22: 421. 1895, as synonym of *P. minus* Nash. Muhlenberg does not give this a varietal name, noting only "varietas minor occurrit ubique in cultis magis aridis."
Panicum minimum Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 27: 4. 1900. Based on *P. capillare* var. *minimum* Engelm.
- Panicum pilcomayense* Hack., *Herb. Boiss. Bul. II. 7: 449.* 1907. Pilcomayo, Paraguay, *Rojas* 105.
- (19) *Panicum pinetorum* Swallen, *Biol. Soc. Wash. Proc.* 55: 93. 1942. Bonita Springs, Fla., *Silveus* 6604.
- (147) *Panicum plenum* Hitchc. and Chase, U. S. Natl. Herb. Contrib. 15: 80. f. 69. 1910. Mangas Springs, N. Mex., *Metcalf* 739.
- (74) *Panicum polyanthes* Schult., *Mantissa* 2: 257. 1824. Based on *P. multiflorum* Ell.
Panicum multiflorum Ell., Bot. S. C. and Ga. 1: 122. 1816. Not *P. multiflorum* Poir., 1816. Presumably South Carolina.
Panicum microcarpon Muhl., *Descr. Gram.* 111. 1817. Not *P. microcarpon* Muhl. ex Ell., 1816. Virginia, "Cherokee" [type] and Delaware.
Panicum firmandum Steud., *Syn. Pl. Glum.* 1: 418. 1855. North Carolina, *M. A. Curtis*.
Panicum microcarpon var. *isophyllum* Scribn., *Tenn. Agr. Expt. Sta. Bul.* 7: 51. f. 54. 1894. [Alleghany Springs, Tenn., *Gayle*.]
- (12) *Panicum polycaulon* Nash, *Torrey Bot. Club Bul.* 24: 200. 1897. Tampa, Fla., *Nash* 2420a.
Panicum dichotomum var. *glabrescens* Griseb., *Fl. Brit. W. Ind.* 553. 1864. Jamaica, *Purdie*.
- (87) *Panicum portoricense* Desv. ex

- Hamilt., Prodr. Pl. Ind. Occ. 11. 1825. Puerto Rico.
- Panicum pauciciliatum* Ashe, Elisha Mitchell Sci. Soc. Jour. 16: 87. 1900. Wilmington, N. C., Ashe in 1899.
- (53) *Panicum praecocius* Hitchc. and Chase, Rhodora 8: 206. 1906. Wady Petra, Ill., V. H. Chase 649.
- (61) *Panicum pseudopubescens* Nash, Torrey Bot. Club Bul. 26: 577. 1899. Auburn, Ala., Earle and Baker 1537.
- Panicum villosissimum* var. *pseudopubescens* Fernald, Rhodora 36: 79. 1934. Based on *P. pseudopubescens* Nash.
- Panicum euchlamydeum* Shinnery, Amer. Midl. Nat. 32: 170. 1944. Adams County, Wis., Shinnery and Shaw 4415.
- (118) *Panicum purpurascens* Raddi, Agrost. Bras. 47. 1823. Rio de Janeiro, Brazil, Raddi. (*P. purpurascens* Opiz, 1822, is a name only.)
- Panicum barbinode* Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 1: 256. 1834. Bahia, Brazil.
- Panicum guadaloupense* Steud., Syn. Pl. Glum. 1: 61. 1854. Guadeloupe.
- Panicum equinum* Salzm. ex Steud., Syn. Pl. Glum. 1: 67. 1854. Bahia, Brazil, Salzmann.
- Panicum pictigluma* Steud., Syn. Pl. Glum. 1: 73. 1854. Brazil.
- Brachiaria purpurascens* Henr., Blumea 3: 434. 1940. Based on *Panicum purpurascens* Raddi.
- This species has been referred to *P. numidianum* Lam. Together with that and *P. barbinode* Trin. it is included under *Brachiaria mutica* (Forsk.) Stapf, in Prain, Fl. Trop. Afr. 9: 526. 1919.
- (2) *Panicum ramisetum* Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 27: 9. 1900. Based on *P. subspicatum* Vasey.
- Panicum subspicatum* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 8: 25. 1889. Not *P. subspicatum* Desv., 1831. Texas, Nealley.
- Chaetochloa ramiseta* Smyth, Kans. Acad. Sci. Trans. 25: 89. 1913. Based on *Panicum ramisetum* Scribn.
- Setaria ramiseta* Pilger in Engl. and Prantl, Pflanzenfam. ed. 2. 14e: 72. 1940. Presumably based on *Panicum ramisetum* Scribn.
- (122) *Panicum ramosum* L., Mant. Pl. 1: 29. 1767. "In Indiis."
- (97) *Panicum ravenelii* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 24: 36. 1901. Based on *P. scoparium* as described by Elliott. [South Carolina and Georgia.]
- Panicum scoparium* var. *majus* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 8: 32. 1889. South Carolina, Ravenel.
- Panicum scoparium* var. *genuinum* Scribn., Tenn. Agr. Expt. Sta. Bul. 7: 48. 1894. Based on *P. scoparium* Lam., as described by Elliott.
- (104) *Panicum recognitum* Fernald, Rhodora 40: 331. pl. 497, 498. 1938. Camden County, N. J., Long 7671.
- (149) *Panicum repens* L., Sp. Pl. ed. 2. 87. 1762. Southern Europe.
- Panicum littorale* Mohr ex. Vasey, Bot. Gaz. 4: 106. 1879. Mobile, Ala., Mohr.
- (119) *Panicum reptans* L., Syst. Nat. ed. 10. 2: 870. 1759. [Jamaica, Browne.]
- Panicum grossarium* L., Syst. Nat. ed. 10. 2: 871. 1759. [Jamaica, Browne, synonym of *P. reptans* L.]
- Panicum prostratum* Lam., Tabl. Encycl. 1: 171. 1791. West Indies [type from Dominican Republic].
- Panicum caespitosum* Swartz, Fl. Ind. Occ. 1: 146. 1797. Jamaica, Swartz.
- Panicum insularum* Steud., Syn. Pl. Glum. 1: 61. 1854. Lesser Antilles [Hohenacker].
- Brachiaria prostrata* Griseb., Abhandl. Gesell. Wiss. Göttingen 7: 263. 1857. Based on *Panicum prostratum* Lam.
- Panicum aurelianum* Hale in Wood, Class-book ed. 1861. 787. 1861. New Orleans, La., Hale.
- Panicum prostratum* var. *pilosum* Eggers, Fl. St. Croix and Virgin Isl. 104. 1879. St. Croix.
- Urochloa reptans* Stapf in Prain, Fl. Trop. Afr. 9: 601. 1920. Based on *Panicum reptans* L.
- Brachiaria reptans* Gard. and C. E. Hubb. in Hook. Icon. Pl. 3363: 3. 1938. Based on *Panicum reptans* L.
- (3) *Panicum reverchoni* Vasey, U. S. Dept. Agr. Div. Bot. Bul. 8: 25. 1889. [Dallas] Tex., Reverchon.
- Chaetochloa reverchoni* Smyth, Kans. Acad. Sci. Trans. 25: 88. 1913. Based on *Panicum reverchoni* Vasey.
- Setaria reverchoni* Pilger in Engl. and Prantl, Pflanzenfam. ed. 2. 14e: 72. 1940. Based on *Panicum reverchoni* Vasey.
- (163) *Panicum rhizomatum* Hitchc. and Chase, U. S. Natl. Herb. Contrib. 15: 109. f. 104. 1910. Orangeburg, S. C., Hitchcock 450.
- Panicum anceps* var. *rhizomatum* Fernald, Rhodora 36: 73. 1934. Based on *P. rhizomatum* Hitchc. and Chase.
- (36) *Panicum roanokense* Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 44. 1898. Roanoke Island, N. C., Ashe in 1898.
- Panicum curtivaginum* Ashe, Elisha Mitchell Sci. Soc. Jour. 16: 85. 1900. Petit Bois Island, Miss., Tracy [4584].
- (106) *Panicum scabriusculum* Ell., Bot. S. C. and Ga. 1: 121. 1816. Savannah, Ga., Baldwin.
- Panicum lanuginosum* Bosc ex Spreng., Syst. Veg. 1: 319. 1825. Not *P. lanuginosum* Ell., 1816. Georgia.
- Panicum eriophorum* Schult., Mantissa 3 (Add. 1): 591. 1827. Based on *P. lanuginosum* Bosc.

- Panicum nealleyi* Vasey, Torrey Bot. Club Bul. 13: 25. 1886. Texas, *Nealley*.
Panicum dichotomum var. *elatum* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 8: 31. 1889. No locality cited. [Mobile, Ala., *Mohr*.]
Panicum viscidum var. *scabriusculum* Beal, Grasses N. Amer. 2: 143. 1896. Based on "*P. scabriusculum* Chapm. non Ell." Chapman uses Elliott's name correctly.
- (63) *Panicum scoparioides* Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 53. 1898. Centreville, Del., *Commons* 283.
Panicum villosissimum var. *scoparioides* Fernald, Rhodora 36: 79. 1934. Based on *P. scoparioides* Ashe.
- (102) *Panicum scoparium* Lam., Encycl. 4: 744. 1798. South Carolina, *Michaux*.
Panicum pubescens Lam., Encycl. 4: 748. 1798. South Carolina, *Michaux*.
Panicum viscidum Ell., Bot. S. C. and Ga. 1: 123. pl. 7. f. 3. 1816. Presumably South Carolina.
Panicum nitidum var. *velutinum* Doell in Mart., Fl. Bras. 2²: 247. 1877. Based on *P. viscidum* Ell.
Panicum laxiflorum var. *pubescens* Chapm., Fl. South. U. S. ed. 3. 586. 1897. Not *P. laxiflorum* var. *pubescens* Vasey, 1892. Based on *P. pubescens* Lam., but misapplied to *P. strigosum* Muhl.
Chasea pubescens Nieuwl., Amer. Midl. Nat. 2: 64. 1911. Based on *Panicum pubescens* Lam.
- (95) *Panicum scribnerianum* Nash, Torrey Bot. Club Bul. 22: 421. 1895. Based on *P. scoparium* as described by Watson in Gray's Manual. [Type, Pennsylvania, *Carey* in 1836.]
Panicum macrocarpon Torr., Fl. North. and Mid. U. S. 143. 1823. Not *P. macrocarpon* LeConte, 1818. Deerfield, Mass., *Cooley*.
Panicum scoparium S. Wats. ex Nash, Torrey Bot. Club Bul. 22: 421. 1895, as synonym of *P. scribnerianum* Nash.
Panicum oligosanthos var. *scribnerianum* Fernald, Rhodora 36: 80. 1934. Based on *P. scribnerianum* Nash.
- (64) *Panicum shastense* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 35: 3. 1901. Castle Crags, Calif., *Greata* in 1899.
- Panicum sonorum* Beal, Grasses N. Amer. 2: 130. 1896. Based on *P. capillare* var. *miliaceum* Vasey.
Panicum capillare var. *miliaceum* Vasey, U. S. Natl. Herb. Contrib. 1: 28. 1890. Not *P. miliaceum* L. 1753. Lerdo, Mexico, *Palmer* 947 in 1889.
- (73) *Panicum sphaerocarpon* Ell., Bot. S. C. and Ga. 1: 125. 1816. Georgia, *Baldwin*.
Panicum kalmii Swartz ex Wikstr., Adnot. Bot. 6. 1829. Pennsylvania, ? *Kalm*.
Panicum heterophyllum Swartz ex Wikstr., Adnot. Bot. 6. 1829. Not *P. heterophyllum* Spreng., 1822. As synonym of *P. kalmii* Swartz.
Panicum nitidum var. *crassifolium* A. Gray, N. Amer. Gram. and Cyp. 1: 30. 1834. Name only for specimen from "Pine barrens of New Jersey;" A. Gray ex Doell, in Mart. Fl. Bras. 2²: 247. 1877 (in obs.).
Panicum dichotomum var. *sphaerocarpon* Wood, Class-book ed. 1861. 786. 1861. Presumably based on *P. sphaerocarpon* Ell.
Panicum microcarpon var. *sphaerocarpon* Vasey, Grasses U. S. 12. 1883. Based on *P. sphaerocarpon* Ell.
Panicum vicarium Fourn., Mex. Pl. 2: 20. 1886. Córdoba, Mexico, *Schaffner* 285.
- PANICUM SPHAEROCARPON VAR. INFLATUM (Scribn. and Smith) Hitchc. and Chase, U. S. Natl. Herb. Contrib. 15: 253. f. 275. 1910. Based on *P. inflatum* Scribn. and Smith. (Published as *P. sphaerocarpon inflatum*.)
Panicum inflatum Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Cir. 16: 5. 1899. Biloxi, Miss., *Tracy* 4622.
Panicum mississippiense Ashe, Elisha Mitchell Sci. Soc. Jour. 16: 91. 1900. Mississippi River below New Orleans, La., *Ashe*.
- (39) *Panicum sphagnicola* Nash, Torrey Bot. Club Bul. 22: 422. 1895. Lake City, Fla., *Nash* 2500.
- (40) *Panicum spretum* Schult., Mantissa 2: 248. 1824. Based on Muhlenberg's *Panicum* No. 37. New England.
Panicum nitidum var. *densiflorum* Rand and Redfield, Fl. Mt. Desert 174. 1894. Mount Desert, Maine, *Rand*.
Panicum eatoni Nash, Torrey Bot. Club Bul. 25: 84. 1898. Seabrook, N. H., *Eaton*.
Panicum octonodum Smith, U. S. Dept. Agr., Div. Agrost. Bul. 17: 73. f. 369. 1899. Waller County, Tex., *Thurow* in 1898.
Panicum paucipilum Nash, Torrey Bot. Club Bul. 26: 573. 1899. Wildwood, N. J., *Bicknell* in 1897.
Panicum nitidum octonodum Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 24: 34. 1901. Based on *P. octonodum* Smith.
- (159) *Panicum stipitatum* Nash in Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 17. (ed. 2): 56. f. 352. 1901. Based on *P. elongatum* Pursh.
Panicum elongatum Pursh, Fl. Amer. Sept. 1: 69. 1814. Not *P. elongatum* Salisb., 1796. New Jersey to Virginia. [Type, Delaware.]
Panicum agrostoides var. *elongatum* Scribn., Tenn. Agr. Expt. Sta. Bul. 7:

42. pl. 9. f. 34. 1894. Based on *P. elongatum* Pursh.
- (137) *Panicum stramineum* Hitchc. and Chase, U. S. Natl. Herb. Contrib. 15: 67. f. 50. 1910. Guaymas, Sonora, Palmer 206 in 1887.
- Panicum capillare* var. *stramineum* Gould, Madroño 10: 94. 1949. Based on *P. stramineum* Hitchc. and Chase.
- (13) *Panicum strigosum* Muhl. in Ell., Bot. S. C. and Ga. 1: 126. 1816. [South Carolina and Georgia.]
- Panicum laxiflorum* var. *pubescens* Vasey, U. S. Natl. Herb. Contrib. 3: 30. 1892. No locality cited. [Type, Duval County, Fla., Curtiss (No. H).]
- Panicum longipedunculatum* Scribn., Tenn. Agr. Expt. Sta. Bul. 7: 53. pl. 16. f. 61. 1894. Tennessee, White Cliff Springs, [Scribner, type] Tullahoma.
- (54) *Panicum subvillosum* Ashe, Elisha Mitchell Sci. Soc. Jour. 16: 86. 1900. Carlton, Minn., Ashe.
- Panicum unciphyllum* forma *pilosum* Scribn. and Merr., Rhodora 3: 124. 1901. Orono, Maine, Fernald 501.
- (155) *Panicum tenerum* Beyr. in Trin., Acad. St. Pétersb. Mém. VI Sci. Nat. 1: 341. 1834. Georgia, Beyrich [62].
- Panicum anceps* var. *strictum* Chapm., Fl. South. U. S. 573. 1860. Florida, Chapman.
- This species has been referred to *Panicum stenodes* Griseb., of tropical America.
- (49) *Panicum tennesseense* Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 52. 1898. La Vergne County, Tenn., Biltmore Herbarium 7087.
- Panicum lindheimeri* var. *septentrionale* Fernald, Rhodora 23: 227. 1921. Woodstock, New Brunswick, Fernald and Long 12527.
- Panicum lindheimeri* var. *tennesseense* Farwell, Amer. Midl. Nat. 11: 45. 1928. Based on *Panicum tennesseense* Ashe.
- Panicum lanuginosum* var. *septentrionale* Fernald, Rhodora 36: 77. 1934. Based on *P. lindheimeri* var. *septentrionale* Fernald.
- (76) *Panicum tenue* Muhl., Descr. Gram. 118. 1817. No locality cited.
- Panicum deustum* Brickell and Enslin ex Muhl., Descr. Gram. 119. 1817. Not *P. deustum* Thunb., 1794. As synonym of *P. tenue*.
- Panicum liton* Schult., Mantissa 2: 250. 1824. Based on *P. tenue* Muhl., that name changed because of *P. tenue* Roxb., name only, 1813, not described until 1820.
- Panicum unciphyllum* Trin., Gram. Pan. 242. 1826. North America.
- Panicum macrum* Kunth, Rév. Gram. 1: 40. 1829. Based on *P. tenue* Muhl.
- Panicum parvulum* Muhl. ex Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 27: 4. 1900. Not *P. parvulum* Trin., 1834. As synonym of *P. tenue* Muhl.
- (124) *Panicum texanum* Buckl., Prel. Rpt. Geol. Agr. Survey Tex. App. 3. 1866. Austin, Tex.
- (57) *Panicum thermale* Boland., Calif. Acad. Sci. Proc. 2: 181. 1862. Sonoma County, Calif.
- Panicum ferventicola* Schmoll, Madroño 5: 92. 1939. Yellowstone National Park, Chase.
- Panicum ferventicola* var. *sericeum* Schmoll, Madroño 5: 93. 1939. Yellowstone National Park, A. and E. Nelson 6037.
- Panicum ferventicola* var. *papillosum* Schmoll, Madroño 5: 94. 1939. Alberta, Hitchcock, Amer. Gr. Natl. Herb. 220.
- Panicum lassenianum* Schmoll, Madroño 5: 95. 1939. Plumas County, Calif., Jepson 4082.
- (52) *Panicum thuronii* Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Cir. 16: 5. 1899. Waller County, Tex., Thuron in 1898.
- (145) *Panicum trichoides* Swartz, Prodr. Veg. Ind. Occ. 24. 1788. Jamaica; Hispaniola.
- (78) *Panicum trifolium* Nash, Torrey Bot. Club Bul. 26: 580. 1899. Macon, Ga., Small in 1895.
- (70) *Panicum tsugetorum* Nash, Torrey Bot. Club Bul. 25: 86. 1898. Bronx Park, N. Y., Nash 287.
- Panicum lanuginosum siccanum* Hitchc. and Chase, Rhodora 8: 207. 1906. Starved Rock, Ill., Chase 1602.
- (132) *Panicum tuckermani* Fernald, Rhodora 21: 112. 1919. Lake Memphremagog, Vt., Tuckerman.
- Panicum soboliferum* Tuckerm. ex Scribn. and Merr., Rhodora 3: 106. 1901. Cited as synonym of *P. minimum* Scribn. and Merr., but the Tuckerman specimen from Lake Memphremagog, Vt., cited is not the same species as the type of *P. minimum*, which see under *P. philadelphicum*.
- Panicum philadelphicum* var. *tuckermani* Steyerl. and Schmoll, Rhodora 41: 90. 1939. Based on *Panicum tuckermani* Fernald.
- (167) *Panicum urvilleanum* Kunth, Rév. Gram. 2: 403. pl. 115. 1831. [Concepcion] Chile, Dumont-d'Urville.
- Panicum megastachyum* Presl, Rel. Haenke. 1: 305. 1830. Not *P. megastachyum* Nees, 1826. Huánuco, Peru, Haenke.
- Panicum preslii* Kunth, Rév. Gram. 1: Sup. 10. 1830. Based on *P. megastachyum* Presl.
- Panicum urvilleanum* var. *longiglume* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 17 (ed. 2): 49. 1901. San Jacinto, Calif., Parish Brothers 887.

- (82) *Panicum vernale* Hitchc. and Chase, U. S. Natl. Herb. Contrib. 15: 266. f. 293. 1910. Lake City, Fla., *Hitchcock* 1020.
- (165) *Panicum verrucosum* Muhl., Descr. Gram. 113. 1817. New Jersey, Delaware, and Georgia.
- Panicum debile* Ell., Bot. S. C. and Ga. 1: 129. 1816. Not *P. debile* Desf., 1798. Presumably South Carolina.
- Panicum umbraculum* Bosc ex Spreng., Syst. Veg. 1: 314. 1825, as synonym of *P. verrucosum*.
- Panicum rugosum* Bosc ex Spreng., Syst. Veg. 1: 314. 1825, as synonym of *P. verrucosum*. [Bosc.]
- (5) *Panicum villosissimum* Nash, Torrey Bot. Club Bul. 23: 149. 1896. Macon, Ga., *Small* in 1895.
- Panicum tectum* Willd. ex Spreng., Syst. Veg. 1: 313. 1825. Name only. North America.
- Panicum nitidum* var. *villosum* A. Gray, N. Amer. Gram. and Cyp. 2: 111. 1835.
- Panicum dichotomum* var. *villosum* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 8: 31. 1889. [Type, District of Columbia, Vasey.]
- Panicum nitidum pubescens* Scribn. in Kearney, Torrey Bot. Club Bul. 20: 479. 1893. Name only. Harlan and Bell Counties, Ky., *Kearney* 58 and 141 in part.
- Panicum atlanticum* Nash, Torrey Bot. Club Bul. 24: 346. 1897. Bronx Park, N. Y., *Nash*.
- Panicum haemacarpum* Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 55. 1898. District of Columbia, *Kearney* in 1897 [type]; North Carolina, *Ashe* in 1898; Iowa, *Carver* 258.
- Panicum xanthospermum* Scribn. and Mohr, U. S. Natl. Herb. Contrib. 6: 348. 1901. Greenville, Ala., *Mohr*.
- (151) *Panicum virgatum* L., Sp. Pl. 59. 1753. Virginia [Clayton 578].
- Panicum coloratum* Walt., Fl. Carol. 73. 1788. Not *P. coloratum* L., 1767. South Carolina.
- Eatonia purpurascens* Raf., Jour. Phys. Chym. 89: 104. 1819. New York [type, Long Island].
- Panicum pruinatum* Bernh. ex Trin., Gram. Pan. 191. 1826, as synonym of *P. virgatum*. North America [Delaware], *Bernhardt*.
- Panicum giganteum* Scheele, Linnaea 22: 340. 1849. Between San Antonio and New Braunfels, Tex., *Lindheimer*.
- Panicum glaberrimum* Steud., Syn. Pl. Glum. 1: 94. 1854. Grown at Berlin, seed from North America.
- Ichnanthus glaber* Link ex Steud., Syn. Pl. Glum. 1: 94. 1854, as synonym of *P. glaberrimum* Steud.
- Panicum kunthii* Fourn. ex Hemsl., Biol. Centr. Amer. Bot. 3: 490. 1885. Not *P. kunthii* Steud., 1841. Based on *P. coloratum* L. misapplied by Kunth.
- Panicum virgatum* var. *confertum* Vasey, Torrey Bot. Club Bul. 13: 26. 1886. No locality cited. [Type, Atlantic City, N. J., Vasey.]
- Panicum virgatum* var. *elongatum* Vasey, Torrey Bot. Club Bul. 13: 26. 1886. No locality cited. [Type, White River, S. Dak., Wilcox 13.]
- Panicum virgatum* var. *diffusum* Vasey, Torrey Bot. Club Bul. 13: 26. 1886. "Kansas, Colorado, etc."
- Panicum virgatum* var. *glaucephylla* Cassidy, Colo. Agr. Expt. Sta. Bul. 12: 29. 1890. Colorado.
- Chasea virgata* Nieuwl., Amer. Midl. Nat. 2: 64. 1911. Based on *Panicum virgatum* L.
- Milium virgatum* Lunell, Amer. Midl. Nat. 4: 212. 1915. Based on *Panicum virgatum* L.
- Milium virgatum* var. *elongatum* Lunell, Amer. Midl. Nat. 4: 212. 1915. Based on *Panicum virgatum* var. *elongatum* Vasey.
- PANICUM VIRGATUM var. CUBENSE Griseb., Cat. Pl. Cub. 233. 1866. [Hanábana] Cuba, *Wright* in 1865.
- Panicum virgatum* var. *obtusum* Wood, Amer. Bot. and Flor. pt. 2: 392. 1871. New Jersey.
- Panicum virgatum* var. *breviramosum* Nash, Torrey Bot. Club Bul. 23: 150. 1896. Augusta, Ga., *Small* in 1895.
- Panicum virgatum* var. *thyrsiforme* Linder, Rhodora 24: 14. 1922. Indian River, Fla., *Fredholm* 5580.
- PANICUM VIRGATUM var. SPISSUM Linder, Rhodora 24: 15. 1922. Great Pubnico Lake, Nova Scotia, *Fernald*, *Long*, and *Linder* 19766.
- (90) *Panicum webberianum* Nash, Torrey Bot. Club Bul. 23: 149. 1896. Eustis, Fla., *Nash* 781.
- Panicum onslowense* Ashe, Elisha Mitchell Sci. Soc. Jour. 16: 88. 1900. Wards Mill, Onslow County, N. C., *Ashe*.
- (8) *Panicum wernerii* Scribn. in Britt. and Brown, Illustr. Fl. 3: 501. f. 268b. 1898. New York and Ohio [type, Painesville, *Werner* 60].
- Panicum delawarensense* Ashe, N. C. Agr. Expt. Sta. Bul. 175: 116. 1900. Centerville, Del., *Commons* [48] in 1878.
- Panicum linearifolium* var. *wernerii* Fernald, Rhodora 23: 194. 1921. Based on *P. wernerii* Scribn.
- Panicum strictum* var. *linearifolium* subvar. *wernerii* Farwell, Amer. Midl. Nat. 11: 44. 1928. Based on *P. wernerii* Scribn.
- (92) *Panicum wilcoxianum* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 8: 32. 1889. Nebraska [Fort Niobrara], *Wilcox* in 1888.

- Milium wilcoxianum* Lunell, Amer. Midl. Nat. 4: 213. 1915. Based on *Panicum wilcoxianum* Vasey.
- (69) ***Panicum wilmingtontense*** Ashe, Elisha Mitchell Sci. Soc. Jour. 16: 86. 1900. Wilmington, N. C., Ashe in 1899.
- Panicum alabamense* Ashe, N. C. Agr. Expt. Sta. Bul. 175: 116. 1900. Not *P. alabamense* Trin., 1854. Auburn, Ala., Alabama Biological Survey 1530.
- (44) ***Panicum wrightianum*** Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 11: 44. f. 4. 1898. Vueltabajo, Cuba, Wright 3463.
- Panicum strictum* Bosc ex Roem. and Schult., Syst. Veg. 2: 447. 1817. Not *P. strictum* R. Br., 1810. North America [type, Carolina, Bosc].
- Panicum minutulum* Desv., Opusc. 87. 1833. Not *P. minutulum* Gaud., 1826. Carolina.
- Panicum deminutivum* Peck, N. Y. State Mus. Bul. 10: 27. 1907. Suffolk County, N. Y., Peck in 1906.
- (10) ***Panicum xalapense*** H. B. K., Nov. Gen. et Sp. 1: 103. 1815. Xalapa [Jalapa], Mexico, Humboldt and Bonpland.
- Panicum pumilum* Bosc ex Nees, Agrost. Bras. 228. 1829. Not *P. pumilum* Lam., 1798. Name only. North America [Bosc].
- Panicum rariflorum* Rupr., Acad. Sci. Belg. Bul. 9²: 240. 1842. Not *P. rariflorum* Lam., 1798. Name only. Jalapa, Mexico, Galeotti 5733.
- Panicum ruprechtii* Fourn., Mex. Pl. 2: 21. 1886. Not *P. ruprechtii* Fenzl, 1854. Described from type of *P. rariflorum* Rupr.
- Panicum caricifolium* Scribn. ex Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 57. 1898. Name only. Washington, D. C., Kearney in 1897.
- This is the species described as *Panicum acuminatum* Swartz by Muhlenberg (Descr. Gram. 125. 1817).
- PANICUM XALAPENSE** var. **STRICTIRAMEUM** Hitchc. and Chase, U. S. Natl. Herb. Contrib. 15: 161. f. 148. 1910. Jackson, Miss., Hitchcock 1311. (Published as *P. xalapense strictirameum*.)
- Panicum laxiflorum* var. *strictirameum* Fernald, Rhodora 36: 75. 1934. Based on *P. xalapense strictirameum* Hitchc. and Chase.
- (99) ***Panicum xanthophysum*** A. Gray, N. Amer. Gram. and Cyp. 1: No. 28. 1834. Oneida Lake, N. Y.
- Panicum xanthophysum* forma *amplifolium* Scribn. in Brainerd, Jones, and Eggleston, Fl. Vt. 104. 1900. Burlington, Vt., Jones.
- (35) ***Panicum yadkinense*** Ashe, Elisha Mitchell Sci. Soc. Jour. 16: 85. 1900. Based on *Panicum maculatum* Ashe.
- ?*Panicum dumus* Desv., Opusc. 88. 1831. Tropical America (locality erroneous).
- Panicum maculatum* Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 44. 1898. Not *P. maculatum* Aubl., 1775. Raleigh, N. C., Ashe in 1895.
- (39) **PAPPOPHORUM** Schreb.
- (2) ***Pappophorum bicolor*** Fourn., Mex. Pl. 2: 133. 1886. Toluca, Mexico, Karwinsky 1483.
- (1) ***Pappophorum mucronulatum*** Nees, Agrost. Bras. 412. 1829. Bahia and Piahy, Brazil, Martius.
- Pappophorum vaginatum* Buckl., Prel. Rpt. Geol. Agr. Survey Tex. App. 1. 1866. Western Texas [type, Wright 803].
- Pappophorum apertum* Munro ex Scribn., Torrey Bot. Club Bul. 9: 148. 1882. Camp Lowell, Ariz., Pringle.
- Pappophorum apertum* var. *vaginatum* Scribn. ex L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 535. 1894. Based on *P. vaginatum* Buckl.
- Pappophorum pappiferum* (Lam.) Kuntze var. *mucronulatum* Kuntze, Rev. Gen. Pl. 3³: 365. 1898. Based on *P. mucronulatum* Nees.
- (52) **PARAPHOLIS** C. E. Hubb.
- (1) ***Parapholis incurva*** (L.) C. E. Hubb., Blumea Sup. 3. (Henrard Jubilee vol.): 14. 1946. Based on *Aegilops incurva* L.
- Aegilops incurva* L., Sp. Pl. 1051. 1753. Europe.
- Aegilops incurvata* L., Sp. Pl. ed. 2. 2: 1490. 1763. Europe.
- Agrostis incurvata* Scop., Fl. Carn. 1: 62. 1772. Based on *Aegilops incurvata* L.
- Rottboellia incurvata* L. f., Sup. Pl. 114. 1781. Based on *Aegilops incurvata* L.
- Ophiurus incurvatus* Beauv., Ess. Agrost. 116, 168, 176. 1812. Based on *Rottboellia incurvata* L. f.
- Rottboellia incurva* Roem. and Schult., Syst. Veg. 2: 799. 1817. Presumably based on *Aegilops incurva* L.
- Lepturus incurvatus* Trin., Fund. Agrost. 123. 1820. Based on *Aegilops incurvata* L.
- Lepturus filiformis* var. *incurvatus* Hook. f., Stud. Fl. 455. 1870. Based on *L. incurvatus* Trin.
- Lepturus incurvus* Druce, List Brit. Pl. 85. 1908. Presumably based on *Aegilops incurva* L.
- Lepturus incurvus* subsp. *incurvatus* Briq., Prodr. Fl. Corse 1: 183. 1910. Based on *Lepturus incurvatus* Trin. "sensu stricto."
- Pholiurus incurvatus* Hitchc., U. S. Dept. Agr. Bul. 772: 106. 1920. Based on *Aegilops incurvata* L.
- Pholiurus incurvus* Schinz and Thell., Vierteljahrs. Nat. Gesell. Zürich 66: 265. 1921. Based on *Aegilops incurva* L.

Lepidurus incurvus Janchen in Janchen and Neumayer, Wien. Bot. Zeitschr. 93: 85. 1944. Based on *Aegilops incurva* L., but genus not validly published.

This species has been included in *Pholurus* Trin., but in the type of that, *P. pannonicus* (Host) Trin., the rachis is continuous, the spikelets falling entire, free from the rachis joints.

(136) PASPALUM L.

- (2) *Paspalum acuminatum* Raddi, Agrost. Bras. 25. 1823. Rio de Janeiro, Brazil, Raddi.
- (11) *Paspalum alium* Chase, Wash. Acad. Sci. Jour. 23: 137. f. 1. 1933. Beaumont, Tex., J. F. Combs in 1932.
- (48) *Paspalum bifidum* (Bertol.) Nash, Torrey Bot. Club Bul. 24: 192. 1897. Based on *Panicum bifidum* Bertol.
- Panicum floridanum* Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 1: 248. 1834. Not *Paspalum floridanum* Michx. Florida and Alabama.
- Panicum bifidum* Bertol., Accad. Sci. Bologna Mem. 2: 598. pl. 41. f. 2. e-h. 1850. Alabama.
- Panicum alabamense* Trin. ex Steud., Syn. Pl. Glum. 1: 64. 1854. Alabama, locality erroneously cited as North Carolina.
- Paspalum racemosum* Nutt. ex Chapm., Fl. South. U. S. 571. 1860. Florida to North Carolina and westward.
- Paspalum interruptum* Wood, Class-book ed. 1861. 783. 1861. Louisiana and Texas, Hale.
- Paspalum bifidum* var. *projectum* Fernald, Rhodora 40: 388. pl. 509. 1938. Burt, Sussex County, Va., Fernald and Long 7239.
- (25) *Paspalum blodgettii* Chapm., Fl. South. U. S. 571. 1860. Key West, Fla., Blodgett.
- Paspalum dissectum* Swartz ex Roem. and Schult., Syst. Veg. 2: 308. 1817. Not *P. dissectum* L. 1762. Erroneously given as synonym of *P. caespitosum* Flüge. Jamaica, Swartz.
- Paspalum simpsoni* Nash, Torrey Bot. Club Bul. 24: 39. 1897. No-Name Key, Fla., Simpson 184.
- Paspalum gracillimum* Nash in Small, Fl. Southeast. U. S. 73, 1326. 1903. Key West, Fla., Blodgett.
- Paspalum yucatanum* Chase, U. S. Natl. Herb. Contrib. 28: 121. 1929. Mérida, Yucatan, Schott 597.
- (46) *Paspalum boscianum* Flüge, Monogr. Pasp. 170. 1810. Carolina, Bosc.
- Paspalum virgatum* Walt., Fl. Carol. 75. 1788. Not *P. virgatum* L., 1759. South Carolina.
- Paspalum brunneum* Bosc ex Flüge, Monogr. Pasp. 171. 1810, as synonym of *P. boscianum*. Carolina, Bosc.
- Paspalum purpurascens* Ell., Bot. S. C. and Ga. 1: 108. pl. 6. f. 3. 1816. South Carolina.
- Paspalum confertum* LeConte, Jour. Phys. Chym. 91: 285. 1820. Georgia [LeConte].
- Paspalum virgatum* var. *purpurascens* Wood, Class-book ed. 1861. 781. 1861. Based on *P. purpurascens* Ell.
- (26) *Paspalum caespitosum* Flüge, Monogr. Pasp. 161. 1810. Hispaniola, Poiteau and Turpin.
- Paspalum gracile* Poir. in Lam., Encycl. Sup. 4: 313. 1816. Not *P. gracile* Rudge, 1805. Dominican Republic.
- Paspalum heterophyllum* Desv. ex Poir. in Lam., Encycl. Sup. 4: 315. 1816. Dominican Republic.
- Paspalum poiretii* Roem. and Schult., Syst. Veg. 2: 878. 1817. Based on *P. gracile* Poir.
- Paspalum lineare* Fourn., Mex. Pl. 2: 12. 1886. Not *P. lineare* Trin., 1826. Mexico, Liebmann 187 [type; the other specimen cited, Liebmann 192, is *P. langei*].
- Paspalum caespitosum* var. *longifolium* Vasey, Torrey Bot. Club Bul. 13: 164. 1886. No locality cited. [Type, Garber in 1877.]
- (19) *Paspalum ciliatifolium* Michx., Fl. Bor. Amer. 1: 44. 1803. Carolina, Michaux.
- Paspalum debile* Muhl., Cat. Pl. 8. 1813; Descr. Gram. 91. 1817. Not *P. debile* Michx., 1803. Georgia.
- Paspalum spathaceum* Desv. ex Poir. in Lam., Encycl. Sup. 4: 314. 1816. America.
- Paspalum latifolium* LeConte, Jour. Phys. Chym. 91: 284. 1820. Columbia, S. C.
- Paspalum ciliatifolium* var. *brevifolium* Vasey, Acad. Nat. Sci. Phila. Proc. 1886: 285. 1886. Philadelphia, Pa., Burk.
- Paspalum setaceum* var. *ciliatifolium* Vasey, U. S. Natl. Herb. Contrib. 3: 17. 1892. Based on *P. ciliatifolium* Michx.
- Paspalum chapmani* Nash, N. Y. Bot. Gard. Bul. 1: 290. 1899. Florida, Chapman.
- Paspalum eggertii* Nash, N. Y. Bot. Gard. Bul. 1: 434. 1900. Arkansas [type, Pine Bluff, Eggert in 1896].
- Paspalum blepharophyllum* Nash in Small, Fl. Southeast. U. S. 71, 1326. 1903. Central Florida, Nash 1426.
- Paspalum epile* Nash in Small, Fl. Southeast. U. S. 72, 1326. 1903. Key West, Fla., Blodgett.
- (36) *Paspalum circulare* Nash in Britton, Man. 73. 1901. New York to North Carolina; Missouri. [Type, Bergen County, N. J., Nash in 1889.]
- Paspalum praelongum* Nash in Small, Fl. Southeast. U. S. 74, 1326. 1903.

- Washington, D. C., Nash in 1894.
Paspalum laeve var. *circulare* Stone, N. J. Mus. Ann. Rpt. 1910: 187. 1911. Based on *P. circulare* Nash.
- (31) *Paspalum conjugatum* Bergius, Act. Helv. Phys. Math. 7: 129. pl. 8. 1762. Dutch Guiana.
Paspalum tenue Gaertn., Fruct. et Sem. 2: 2. pl. 80. 1791. Apparently based on *P. conjugatum* Bergius.
Paspalum ciliatum Lam., Tabl. Encycl. 1: 175. 1791. Tropical America [French Guiana, Leblond].
Paspalum renggeri Steud., Syn. Pl. Glum. 1: 17. 1854. Paraguay, Rengger.
Paspalum longissimum Hochst. ex Steud., Syn. Pl. Glum. 1: 19. 1854. Dutch Guiana, Kappler 1556.
Paspalum bicurum Salzmann, ex Doell in Mart., Fl. Bras. 2: 55. 1877, as synonym of *P. conjugatum*. Bahia, Brazil, Salzmann.
Paspalum conjugatum var. *parviflorum* Doell in Mart., Fl. Bras. 2: 55. 1877. Brazil, Manaós, Spruce 894; Piahy, Gardner 3502.
- (47) *Paspalum convexum* Humb. and Bonpl., in Flugge, Monogr. Pasp. 175. 1810. Mexico, Humboldt and Bonpland.
Paspalum hemi-cryptum Wright, An. Acad. Cienc. Habana 8: 204. 1871; Wright and Sauv., Fl. Cubana 196. 1873. Cuba, Wright 3847.
Paspalum inops Vasey, U. S. Natl. Herb. Contrib. 1: 281. 1893. Mexico, Palmer 592 in 1866.
Paspalum inops var. *major* Vasey, in Beal, Grasses N. Amer. 2: 89. 1896. Mexico, Pringle 1875.
- (14) *Paspalum debile* Michx., Fl. Bor. Amer. 1: 44. 1803. Carolina [type] and Georgia, Michaux.
Paspalum dissectum Walt., Fl. Carol. 75. 1788. Not *P. dissectum* L. 1762. South Carolina.
Paspalum dubium DC., Cat. Hort. Monsp. 130. 1813. Native country unknown.
Paspalum infirmum Roem. and Schult., Syst. Veg. 2: 307. 1817. Based on *Paspalum debile* Michx.
Paspalum villosissimum Nash, Torrey Bot. Club Bul. 24: 40. 1897. Eustis, Fla. Nash 946.
- (39) *Paspalum difforme* LeConte, Jour. Phys. Chym. 91: 284. 1820. Georgia.
- (32) *Paspalum dilatatum* Poir. in Lam., Encycl. 5: 35. 1804. Argentina, Comerson.
Paspalum platense Spreng., Syst. Veg. 1: 247. 1825. Montevideo, Uruguay.
Paspalum ovatum Nees ex Trin., Gram. Pan. 113. 1826. Brazil, Besser.
Paspalum lanatum Spreng., Syst. Veg. 4: Cur. Post. 30. 1827. Not *P. lanatum* H. B. K., 1816. Brazil.
Paspalum eriophorum Schult., Mantissa
- 2: 560. 1827. Based on *P. lanatum* Spreng.
Paspalum ovatum var. *grandiflorum* Nees, Agrost. Bras. 43. 1829. Montevideo, Uruguay, Sellow.
Paspalum selloi Spreng. ex Nees, Agrost. Bras. 43. 1829, as synonym of *P. ovatum* var. *grandiflorum* Nees.
Paspalum pedunculare Presl, Rel. Haenk. 1: 217. 1830. Habitat unknown.
Paspalum dilatatum var. *decumbens* Vasey, Torrey Bot. Club Bul. 13: 166. 1886. No locality cited. [Type, Point-a-la-Hache, La., Langlois 27.]
Paspalum dilatatum var. *sacchariferum* Arech., An. Mus. Nac. Montevideo 1: 90. 1894. Uruguay.
Panicum platense Kuntze, Rev. Gen. Pl. 3: 363. 1898. Based on *Paspalum platense* Spreng.
Digitaria dilatata Coste, Fl. France 3: 553. 1906. Based on *Paspalum dilatatum* Poir.
- (1) *Paspalum dissectum* (L.) L. Sp. Pl. ed. 2. 81. 1762. Based on *Panicum dissectum* L.
Panicum dissectum L., Sp. Pl. 57. 1753. Locality erroneously given as "Indiis," the type in the Linnaean Herbarium being from North America, collected by Kalm.
Paspalum dimidiatum L., Syst. Nat. ed. 10. 2: 855. 1759. Based on *Panicum dissectum* L.
Paspalum membranaceum Walt., Fl. Carol. 75. 1788. South Carolina.
Paspalum vaginatum Ell., Bot. S. C. and Ga. 1: 109. 1816. Not *P. vaginatum* Swartz, 1788. Savannah, Ga., Baldwin.
Paspalum walterianum Schult., Mantissa 2: 166. 1824. Based on *P. membranaceum* Walt. In Chapman's Flora (570. 1860.) the name is given as *P. walteri* Schult.
Paspalum tectum Steud., Syn. Pl. Glum. 1: 29. 1854. Florida, Chapman.
Paspalum drummondii C. Muell., Bot. Ztg. 19: 332. 1861. St. Louis, Mo., Drummond 182.
- (5) *Paspalum distichum* L., Syst. Nat. ed. 10. 2: 855. 1759. [Jamaica, Browne.]
Digitaria paspalodes Michx., Fl. Bor. Amer. 1: 46. 1803. Charleston, S. C., Michaux.
Paspalum digitaria Poir. in Lam., Encycl. Sup. 4: 316. 1816. Charleston, S. C., Bosc.
Milium paspalodes Ell., Bot. S. C. and Ga. 1: 104. 1816. Based on *Digitaria paspalodes* Michx., but misapplied to *Axonopus furcatus* (Flügge) Hitchc.
Milium distichum Muhl., Descr. Gram. 78. 1817. Presumably based on *Paspalum distichum* L. Name only, Muhl., Cat. Pl. 10. 1813.
Paspalum michauxianum Kunth, Rév.

- Gram. 1: 25. 1829. Based on *Digitaria paspalodes* Michx.
- Panicum paspaliforme* Presl, Rel. Haenk. 1: 296. 1830. Peru, *Haenke*.
- Panicum polyrrhizum* Presl, Rel. Haenk. 1: 296. 1830. "Monterey, California," but the type from Baja California.
- Paspalum fernandezianum* Colla, Mem. 1: 296. 1830. "Monterey, California" [but specimens probably collected in Baja California], *Haenke*.
- Paspalum fernandezianum* Colla, Mem. Accad. Sci. Torino 39: 27. pl. 59. 1836. Juan Fernandez, Chile, *Bertero*.
- Paspalum chepica* Steud., Syn. Pl. Glum. 1: 21. 1854. Juan Fernandez, Chile, *Bertero* 1223.
- Paspalum vaginatum* var. *pubescens* Doell in Mart., Fl. Bras. 2^o: 75. 1877. Rio de Janeiro, Brazil, *Glaziov* 3612.
- Paspalum schaffneri* Griseb. in Fourn., Mex. Pl. 2: 6. 1886. Mexico, Chapultepec, *Schaffner* 19a; San Angel, *Schaffner* 19c; Mirador, *Schaffner* 19b.
- Paspalum elliottii* S. Wats. in A. Gray, Man. ed. 6. 629. 1890. Based on *Milium paspalodes* Ell. but misapplied to *Axonopus furcatus* (Flügge) Hitchc.
- Paspalum paspaloides* Scribn., Torrey Bot. Club Mem. 5: 29. 1894. Based on *Digitaria paspalodes* Michx. but misapplied to *Axonopus furcatus* (Flügge) Hitchc.
- Digitaria disticha* Fiori and Paol., Icon. Fl. Ital. Illustr. 1: 16. f. 136. 1895. Based on *Paspalum distichum* L.
- Anastrophus paspaloides* Nash in Britton, Man. 75. 1901. Based on *Paspalum paspaloides* Scribn. but misapplied to *Axonopus furcatus* (Flügge) Hitchc.
- Paspalum distichum* var. *digitaria* Hack. in Stuck., An. Mus. Nac. Buenos Aires 13: 424. 1906. Based on *P. digitaria* Poir.
- Paspalum distichum* subsp. *paspalodes* Thell., Mém. Soc. Sci. Nat. Cherbourg 38: 77. 1912. Based on *Digitaria paspalodes* Michx.
- (40) ***Paspalum floridanum*** Michx., Fl. Bor. Amer. 1: 44. 1803. Florida and Georgia, *Michaux*.
- Paspalum macrospermum* Flügge, Monogr. Pasp. 172. 1810. Carolina, *Bosc*.
- Paspalum glabrum* Bosc ex Flügge, Monogr. Pasp. 172. 1810, as synonym of *P. macrospermum* Flügge.
- Paspalum laevigatum* Bosc ex Poir., Encycl. Sup. 4: 313. 1816, as synonym of *P. floridanum* Michx.
- Paspalum laeve* var. *floridanum* Wood, Class-book ed. 1861. 782. 1861. Presumably based on *P. floridanum* Michx.
- PASPALUM FLORIDANUM** var. **GLABRATUM** Engelm. ex Vasey, Torrey Bot. Club Bul. 13: 166. 1886. No locality cited. [Type, Mobile, Ala., *Mohr* in 1884.]
- ?*Paspalum altissimum* LeConte, Jour. Phy. Chym. 91: 285. 1820. Salem, N. C.
- ?*Paspalum laeve* var. *altissimum* Wood, Class-book ed. 1861. 782. 1861. Based on *P. altissimum* LeConte.
- Paspalum glabratum* Mohr, Torrey Bot. Club Bul. 24: 21. 1897. Based on *P. floridanum* var. *glabratum* Engelm.
- (3) ***Paspalum fluitans*** (Ell.) Kunth, Rév. Gram. 1: 24. 1829. Based on *Ceresia fluitans* Ell.
- Paspalum mucronatum* Muhl., Cat. Pl. 8. 1813, name only; Georgia; Descr. Gram. 96. 1817. Mississippi and Georgia.
- Ceresia fluitans* Ell., Bot. S. C. and Ga. 1: 109. pl. 6. f. 4. 1816. Ogeechee, Ga.
- Paspalum natans* LeConte, Jour. Phys. Chym. 91: 285. 1820. Georgia.
- Paspalum frankii* Steud., Syn. Pl. Glum. 1: 19. 1854. New Orleans, La., *Frank*.
- Cymatochloa fluitans* Schlecht., Bot. Ztg. 12: 822. 1854. Based on *Ceresia fluitans* Ell.
- This is the species described under *P. paniculatum* by Walter (Fl. Carol. 75. 1788); included in *P. repens* in Manual ed. 1.
- (41) ***Paspalum giganteum*** Baldw. ex Vasey, Torrey Bot. Club Bul. 13: 166. 1886. No locality cited. [Type, Pablo Creek, Fla., *Curtiss* in 1875.]
- Paspalum longicilium* Nash, N. Y. Bot. Gard. Bul. 1: 435. 1900. Eustis, Fla., *Nash* 1359.
- (8) ***Paspalum hartwegianum*** Fourn., Mex. Pl. 2: 12. 1886. León, Mexico, *Hartweg* 245.
- Paspalum buckleyanum* Vasey, Torrey Bot. Club Bul. 13: 167. 1886. Texas, *Buckley*. In Jacks., Ind. Kew. Sup. 1: 312. 1906, the name is erroneously listed under *Panicum*.
- (45) ***Paspalum hydrophilum*** Henr., Med. Rijks Herb. Leiden 45: 1. pl. 1922. Paraguay, *Balansa* in 1884.
- Paspalum intermedium*** Munro ex Morong, Ann. N. Y. Acad. Sci. 7: 258. 1893. Paraguay, *Morong* 1019.
- (34) ***Paspalum laeve*** Michx., Fl. Bor. Amer. 1: 44. 1803. Georgia, *Michaux*.
- Paspalum undulosum* LeConte, Jour. Phys. Chym. 91: 284. 1820. Georgia [LeConte].
- Paspalum angustifolium* LeConte, Jour. Phys. Chym. 91: 285. 1820. Carolina and Georgia [LeConte].
- Paspalum lecomteanum* Schult., Mantissa 2: 168. 1824. Based on *P. undulosum* LeConte.
- Paspalum punctulatum* Bertol., Accad. Sci. Bologna Mem. 2: 599. pl. 42. f. a-e. 1850. Alabama.
- Paspalum alternans* Steud., Syn. Pl. Glum. 1: 26. 1854. Louisiana, *Hartman* 40.

- Paspalum tenue* Darby, Bot. South. States 576. 1857. Not *P. tenue* Gaertn., 1791. Georgia and northward.
- Paspalum laeve* var. *undulosum* Wood, Class-book ed. 1861. 782. 1861. Based on *P. undulosum* LeConte.
- Paspalum angustifolium* var. *tenue* Wood, Amer. Bot. and Flor. pt. 2: 390. 1871. New Jersey and south.
- Paspalum laeve* var. *angustifolium* Vasey, Torrey Bot. Club Bul. 13: 165. 1886. Based on *P. angustifolium* LeConte.
- Paspalum laeve* var. *brevifolium* Vasey, U. S. Natl. Herb. Contrib. 3: 18. 1892. No locality cited. [Type, Texas, Nealley in 1886.]
- Paspalum australe* Nash in Britton, Man. 1039. 1901. Stone Mt., Ga., Small in 1895.
- Paspalum laeve australe* Nash in Hitchc., Rhodora 8: 205. 1906. Based on *P. australe* Nash.
- (24) *Paspalum langei* (Fourn.) Nash, N. Amer. Fl. 17: 179. 1912. Based on *Dimorphostachys langei* Fourn.
- Panicum senescens* Trin. ex Steud., Nom. Bot. ed. 2: 263. 1841, name only. [Mexico, Schiede.]
- Paspalum abbreviatum* Trin. ex Fourn., Mex. Pl. 2: 10. 1886, name only. Mexico, Schiede 888.
- Dimorphostachys langei* Fourn., Mex. Pl. 2: 14. 1886. Mexico, Liebmann 186.
- Dimorphostachys drummondii* Fourn., Mex. Pl. 2: 15. 1886. Not *Paspalum drummondii* C. Muell., 1861. Texas, Drummond [350].
- Panicum squamatum* Fourn., Mex. Pl. 2: 18. 1886. Not *Paspalum squamatum* Steud., 1854. Mexico, Karwinsky 982.
- Paspalum drummondii* Vasey, U. S. Natl. Herb. Contrib. 3: 18. 1892. Not *P. drummondii* C. Muell., 1861. Based on *Dimorphostachys drummondii* Fourn.
- Paspalum oricola* Millsp. and Chase, Field Mus. Bot. 3: 28. f. 28, 29. 1903. Island of Cozumel, Yucatan, Mills-paugh Pl. Uto. 1480.
- Dimorphostachys ciliifera* Nash in Small, Fl. Southeast. U. S. 78, 1327. 1903. Manatee, Fla., Simpson 97.
- Paspalum ciliiferum* Hitchc., U. S. Natl. Herb. Contrib. 12: 201. 1909. Based on *Dimorphostachys ciliifera* Nash.
- (27) *Paspalum laxum* Lam., Tabl. Encycl. 1: 176. 1791. Tropical America [probably St. Croix], Richard.
- Paspalum glabrum* Poir. in Lam., Encycl. 5: 30. 1804. Puerto Rico, Ledru.
- Paspalum miliodeum* Desv. ex Poir. in Lam., Encycl. Sup. 4: 315. 1816. Puerto Rico.
- Paspalum miliare* Spreng., Syst. Veg. 1: 247. 1825. Based on *P. miliodeum* Desv.
- Paspalum ischnocaulon* Trin., Gram. Icon. 2: pl. 126. 1828. Source erroneously given as East Indies, doubtless error for West Indies.
- Paspalum floribundum* Desv., Opusc. 58. 1831. West Indies.
- Paspalum rhizomatosum* Steud., Syn. Pl. Glum. 1: 17. 1854. Guadeloupe, Duchassaing.
- Paspalum koleopodum* Steud., Syn. Pl. Glum. 1: 18. 1854. Guadeloupe, Duchassaing.
- Paspalum laxum* var. *lamarckianum* Doell in Mart., Fl. Bras. 2: 86. 1877. Based on *P. laxum* Lam., but misapplied to a Brazilian species.
- Paspalum helleri* Nash, Torrey Bot. Club Bul. 30: 376. 1903. Santurce, Puerto Rico, Heller 10.
- Paspalum tenacissimum* Mez, Bot. Jahrb. Engler 56: Beibl. 125: 10. 1921. Puerto Rico, Hioram 804.
- (38) *Paspalum lentiferum* Lam., Tabl. Encycl. 1: 175. 1791. Carolina, Fraser.
- Paspalum lanuginosum* Bosc ex Beauv., Ess. Agrost. 12. 1812. Name only. [Carolina, Bosc.]
- Paspalum lanuginosum* Willd. ex Steud., Nom. Bot. ed. 2: 271. 1841, as synonym of *P. lentiferum* Lam.
- Paspalum curtisianum* Steud., Syn. Pl. Glum. 1: 26. 1854. Carolina, M. A. Curtis.
- Paspalum praecox* var. *curtisianum* Vasey, Torrey Bot. Club Bul. 13: 165. 1886. Based on *P. curtisianum* Steud.
- Paspalum glaberrimum* Nash in Small, Fl. Southeast. U. S. 76, 1326. 1903. Central Florida, Nash 1619.
- Paspalum tardum* Nash in Small, Fl. Southeast. U. S. 76, 1326. 1903. Florida, Nash 2047.
- Paspalum kearneyi* Nash in Small, Fl. Southeast. U. S. 77, 1326. 1903. Nicholson, Miss., Kearney 357.
- Paspalum amplum* Nash in Small, Fl. Southeast. U. S. 77, 1326. 1903. Marianna, Fla., Tracy 3682.
- (7) *Paspalum lividum* Trin. in Schlecht., Linnaea 26: 383. 1854. Mexico, Schiede.
- (12) *Paspalum longepedunculatum* LeConte, Jour. Phys. Chym. 91: 284. 1820. North Carolina [LeConte].
- Paspalum setaceum* var. *longepedunculatum* Wood, Class-book, ed. 1861. 782. 1861. Based on *P. longepedunculatum* LeConte.
- Paspalum kentuckiense* Nash in Britton, Man. 1039. 1901. Poor Fork, Ky., Kearney in 1893.
- (35) *Paspalum longipilum* Nash, N. Y. Bot. Gard. Bul. 1: 435. 1900. Eustis, Fla., Nash 1027.
- Paspalum laeve* var. *pilosum* Scribn., Tenn. Agr. Expt. Sta. Bul. 7: 34. 1894. Tennessee [type, Madisonville, Scribner].
- Paspalum plenipilum* Nash in Britton,

- Man. 73. 1901. New Jersey [type, Clifton, Nash in 1892].
- Paspalum malacophyllum** Trin. Gram. Icon. 3: pl. 271. 1831. Brazil.
- (10) **Paspalum minus** Fourn., Mex. Pl. 2: 6. 1886. Mexico, *Bourgeau* 2298 [type], *Liebmann* 154.
- (23) **Paspalum monostachyum** Vasey in Chapm., Fl. South. U. S. ed. 2: 665. 1883. South Florida, *Garber* [224].
- Paspalum rectum* var. *longispicatum* Vasey, Bot Gaz. 9: 54, 55. 1884. Miami, Fla., *Garber*.
- Paspalum solitarium* Nash in Small, Fl. Southeast. U. S. 77, 1326. 1903. Based on *Paspalum monostachyum* "Vasey not Walp." Walper's is a name only.
- (9) **Paspalum notatum** Flügge, Monogr. Pasp. 106. 1810. St. Thomas, West Indies.
- Paspalum taphrophyllum* Steud., Syn. Pl. Glum. 1: 19. 1854. Martinique, *Sieber* 365 [error for 364].
- Paspalum distachyon* Willd. ex Doell in Mart., Fl. Bras. 2: 73. 1877. Not *P. distachyon* Poit., 1834. As synonym of *P. notatum*.
- Paspalum notatum* var. *latiflorum* Doell in Mart., Fl. Bras. 2: 73. 1877. Brazil and Uruguay, *Sellow*.
- Paspalum saltense* Arech., An. Mus. Nac. Montevideo 1: 53. 1894. Department del Salto, Uruguay.
- PASPALUM NOTATUM** var. **SAURAE** Parodi, Univ. Nac. Buenos Aires Rev. Agron. 15: 55. 1948. Entre Rios, Argentina, *Parodi* 12670.
- Paspalum paucispicatum** Vasey, U. S. Natl. Herb. Contrib. 1: 281. 1893. Guadalajara, Mexico, *Palmer* 243 in 1886.
- (28) **Paspalum pleostachyum** Doell, in Mart., Fl. Bras. 2: 58. 1877. Bahia, Brazil (*Salzmann*, herb. Bahiense n. 665).
- (43) **Paspalum plicatum** Michx., Fl. Bor. Amer. 1: 45. 1803. Georgia and Florida, *Michaux*.
- Paspalum undulatum* Poir. in Lam., Encycl. 5: 29. 1804. Puerto Rico, *Ledru*.
- Paspalum plicatum* Pers., Syn. Pl. 1: 86. 1805, error for *plicatulum*.
- Paspalum lenticulare* H. B. K., Nov. Gen. et Sp. 1: 92. 1815. Venezuela, *Humboldt* and *Bonpland*.
- Paspalum gracile* LeConte, Jour. Phys. Chym. 91: 285. 1820. Not *P. gracile* Rudge, 1805. Georgia, *LeConte*.
- Paspalum leptos* Schult., Mantissa 2: 173. 1824. Based on *P. gracile* LeConte.
- Paspalum montevidense* Spreng., Syst. Veg. 1: 246. 1825. Montevideo, Uruguay, *Sellow*.
- Paspalum tenue* Kunth, Rév. Gram. 1: 26. 1829. Not *P. tenue* Gaertn., 1791. Based on *P. gracile* LeConte.
- Paspalum multiflorum* Desv., Opusc. 58. 1831. Brazil.
- Paspalum orthos* Schult. ex Kunth, Enum. Pl. 1: 57. 1833. Apparently misprint for *P. leptos*.
- Paspalum marginatum* Spreng. ex Steud., Nom. Bot. ed. 2: 2: 272. 1841. Not *P. marginatum* Trin., 1826. As synonym of *P. undulatum* Poir. [Puerto Rico.]
- Paspalum campestre* Schlecht., Linnaea 26: 131. 1853. Not *P. campestre* Trin., 1834. Venezuela, *Wagener* 392.
- Paspalum atrocarpum* Steud., Syn. Pl. Glum. 1: 25. 1854. Habitat unknown. *Dumont-d'Urville*.
- Paspalum virgatum* var. *undulatum* Wood, Amer. Bot. and Flor. pt. 2: 390. 1871. Eastern States.
- Paspalum antillense* Husnot, Soc. Linn. Normand. Bul. II. 5: 260. 1871. Guadeloupe, *Husnot* 76.
- Paspalum saxatile* Salzmann, ex Doell, in Mart., Fl. Bras. 2: 76. 1877, as synonym of *P. plicatulum* Michx. Brazil, *Salzmann*.
- Paspalum decumbens* Sagot ex Doell in Mart., Fl. Bras. 2: 77. 1877. Not *P. decumbens* Swartz, 1788. As synonym of *P. plicatulum* Michx. French Guiana, *Sagot* 1342.
- Paspalum plicatulum* var. *intumescens* Doell in Mart., Fl. Bras. 2: 78. 1877. Lagoa Santa, Brazil, *Warming*.
- Paspalum pauperculum* Fourn., Mex. Pl. 2: 10. 1886. San Luis Potosí, Mexico, *Virlet* 1320.
- Paspalum pauperculum* var. *altius* Fourn., Mex. Pl. 2: 10. 1886. Orizaba, Mexico, *Bourgeau* 2033 [probably misprint for 2633].
- Panicum plicatulum* Kuntze, Rev. Gen. Pl. 3: 363. 1898. Based on *Paspalum plicatulum* Michx.
- (37) **Paspalum praecox** Walt., Fl. Carol. 75. 1788. South Carolina.
- (20) **Paspalum propinquum** Nash, N. Y. Bot. Gard. Bul. 1: 291. 1899. Eustis, Fla., *Nash* 1427.
- (16) **Paspalum psammophilum** Nash in Hitchc., Rhodora 8: 205. 1906. Based on *P. prostratum* Nash.
- Paspalum prostratum* Nash in Britton, Man. 74. 1901. Not *P. prostratum* Scribn. and Merr., 1901 (earlier than the preceding). New York to Delaware [type, Kingsbridge, N. Y., *Nash* 514].
- (18) **Paspalum pubescens** Muhl. in Willd., Enum. Pl. 89. 1809. Carolina.
- Paspalum muhlenbergii* Nash in Britton, Man. 75. 1901. Massachusetts to Georgia, Missouri, Oklahoma, and Mississippi. [Type, Van Cortlandt Park, N. Y., *Bicknell* in 1896.]
- Paspalum pubescens* var. *muhlenbergii* House, N. Y. State Mus. Bul. 243-244: 39. 1923. Based on *Paspalum muhlenbergii* Nash.
- Paspalum ciliatifolium* var. *muhlenbergii*

- Fernald, Rhodora 36: 20. 1934. Based on *P. muhlenbergii* Nash.
- (6) *Paspalum pubiflorum* Rupr. ex Fourn., Mex. Pl. 2: 11. 1886. Mexico, *Galeotti* 5747.
- Paspalum planifolium* Fourn., Mex. Pl. 2: 10. 1886. Mexico, San Luis Potosí, *Virlet* [type; the other specimen cited, *Müller* 2062, is *P. lividum*].
- Paspalum pubiflorum* var. *viride* Fourn., Mex. Pl. 2: 11. 1886. San Luis Potosí, *Virlet* 1328.
- Paspalum hallii* Vasey and Scribn., Torrey Bot. Club Bul. 13: 165. 1886, as doubtful synonym of *P. remotum* Remy, a Bolivian species. Description drawn from *Hall* 804, Texas.
- Paspalum remotum* var. *glaucum* Scribn. in Vasey, Torrey Bot. Club Bul. 13: 165. 1886. No locality cited. [Type, Grapevine Canyon, Tex. *Havard* in 1883.]
- Paspalum pubiflorum* var. *glaucum* Scribn., U. S. Natl. Herb. Contrib. 3: 19. 1892. Southwestern Texas and Mexico [type same as preceding].
- PASPALUM PUBIFLORUM* VAR. *GLABRUM* Vasey ex Scribn., Tenn. Agr. Expt. Sta. Bul. 7: 32. pl. 5. f. 18. 1894. Belle Meade, Tenn., *Scribner* in 1892.
- Paspalum remotum* var. *glabrum* Vasey, Torrey Bot. Club Bul. 13: 166. 1886. No locality cited. [Type, Plaquemines Parish, La., *Langlois* 26.]
- Paspalum geminum* Nash, N. Y. Bot. Gard. Bul. 1: 434. 1900. Eustis, Fla., *Nash* 680.
- Paspalum laeviglume* Scribn. ex Nash in Small, Fl. Southeast. U. S. 75, 1326. 1903. Based on *P. remotum* var. *glabrum* Vasey.
- Paspalum racemosum* Lam., Tabl. Encycl. 1: 176. 1791. Peru.
- (21) *Paspalum rigidifolium* Nash, N. Y. Bot. Gard. Bul. 1: 292. 1899. Eustis, Fla., *Nash* 629.
- (30) *Paspalum sauetii* Chase, U. S. Natl. Herb. Contrib. 28: 147. f. 90. 1919. Cuba, *Léon* 8982.
- Paspalum scrobiculatum* L., Mantissa pl. 1: 29. 1767. India.
- (13) *Paspalum setaceum* Michx., Fl. Bor. Amer. 1: 43. 1803. South Carolina, *Michaux*.
- Paspalum hirsutum* Retz., misapplied by Poir., in Lam., Encycl. 5: 28. 1804. Carolina, *Bosc*.
- Paspalum leptostachyum* DC., Cat. Hort. Monsp. 130. 1813. Not *P. leptostachyum* Humb. and Bonpl., 1810. No locality cited, type without locality.
- Paspalum incertum* Roem. and Schult., Syst. Veg. 2: 308. 1817. Based on *P. leptostachyum* DC.
- Paspalum eriophorum* Willd. ex Nees., Agrost. Bras. 56. 1829. Not *P. eriophorum* Schult., 1827. Native country unknown.
- Paspalum setaceum* var. *calvescens* Fernald, Rhodora 49: 121. pl. 1057. 1947. Nansemond County, Va., *Fernald*, *Long*, and *Clement* 15191.
- (17) *Paspalum stramineum* Nash in Britton, Man. 74. 1901. Nebraska [type, Hooker County, *Rydberg* 1582], Kansas, and Indian Territory [Oklahoma].
- Paspalum bushii* Nash, in Britton, Man. 74. 1901. Missouri [type, *Bernie*, *Bush* 730].
- Paspalum ciliatifolium* var. *stramineum* Fernald, Rhodora 36: 20. 1934. Based on *P. stramineum* Nash.
- (15) *Paspalum supinum* Bosc ex Poir. in Lam., Encycl. 5: 29. 1804. Carolina, *Bosc*.
- Paspalum dasyphyllum* Ell., Bot. S. C. and Ga. 1: 105. 1816. South Carolina.
- Paspalum setaceum* var. *supinum* Trin., Gram. Icon. 2: pl. 130. 1828. Based on *P. supinum* Bosc.
- Paspalum ciliatifolium* var. *dasyphyllum* Chapm., Fl. South. U. S. ed. 3. 578. 1897. Based on *P. dasyphyllum* Ell.
- (44) *Paspalum texanum* Swallen, Biol. Soc. Wash. Proc. 55: 94. 1942. Port Lavaca, Calhoun County, Tex., *Mott* 261.
- (22) *Paspalum unispicatum* (Scribn. and Merr.) Nash, N. Amer. Fl. 17: 193. 1912. Based on *Panicum unispicatum* Scribn. and Merr.
- Panicum unispicatum* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 24: 14. 1901. Oaxaca, Mexico, *Pringle* 6717.
- (33) *Paspalum urvillei* Steud., Syn. Pl. Glum. 1: 24. 1854. [Brazil] *Dumont-d'Urville*.
- Paspalum ovatum* var. *parviflorum* Nees, Agrost. Bras. 43. 1829. Brazil, *Martius*.
- Paspalum velutinum* Trin. ex Nees, Agrost. Bras. 43. 1829, as synonym of *P. ovatum* var. *parviflorum* Nees.
- Paspalum dilatatum* var. *parviflorum* Doell in Mart., Fl. Bras. 2^o: 64. 1877. Pernambuco, *Forsell*; Lagoa Santa, *Warming* [type].
- Paspalum virgatum* var. *parviflorum* Doell in Mart., Fl. Bras. 2^o: 89. 1877. Brazil, *Raben*.
- Paspalum virgatum* var. *pubiflorum* Vasey, Torrey Bot. Club Bul. 13: 167. 1886. No locality cited. [Type, Atakopus, La., *Langlois* in 1884.]
- Paspalum larranagai* Arech., An. Mus. Nac. Montevideo 1: 60. pl. 2. 1894. Uruguay.
- Paspalum vaseyanum* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 17: 32. f. 328. 1899. Based on *P. virgatum* var. *pubiflorum* Vasey.
- Paspalum griseum* Hack. ex Corrêa, Fl. Brazil 128. 1909. Name only. Brazil [*Glaziou* 16559].

- (4) *Paspalum vaginatum* Swartz, Prodr. Veg. Ind. Occ. 21. 1788. Jamaica, Swartz.
Digitaria foliosa Lag., Gen. et Sp. Nov. 4. 1816. Habana, Cuba.
Paspalum tristachyum LeConte, Jour. Phys. Chym. 91: 285. 1820. Georgia [LeConte].
Digitaria tristachya Schult., Mantissa 2: 261. 1824. Based on *Paspalum tristachyum* LeConte.
Paspalum brachiatum Trin. ex Nees, Agrost. Bras. 62. 1829, as synonym of *P. vaginatum*. Martinique, Sieber.
Paspalum foliosum Kunth, Rév. Gram. 1: 25. 1829. Based on *Digitaria foliosa* Lag.
Paspalum klineanum Presl, Rel. Haenk. 1: 209. 1830. Peru, Haenke.
Paspalum inflatum A. Rich. in Sagra, Hist. Cuba 11: 298. 1850. Habana, Cuba, Sagra.
Paspalum didactylum Salzm. ex Steud., Syn. Pl. Glum. 1: 20. 1854, as synonym of *P. vaginatum* Swartz. Brazil, Salzmann.
Panicum vaginatum Gren. and Godr., Fl. France 3: 462. 1855. Not *P. vaginatum* Nees, 1829. Based on *Paspalum vaginatum* Swartz.
Paspalum distichum var. *tristachyum* Wood, Class-book ed. 1861. 783. 1861. Presumably based on *P. tristachyum* LeConte.
Paspalum distichum var. *vaginatum* Swartz ex Griseb., Fl. Brit. W. Ind. 541. 1864. Based on *P. vaginatum* Swartz.
Paspalum reptans Poir. ex Doell, in Mart., Fl. Bras. 2: 75. 1877, as synonym of *P. vaginatum*.
Paspalum vaginatum var. *nanum* Doell in Mart., Fl. Bras. 2: 75. 1877. Rio de Janeiro, Brazil, Glaziou 4346.
Paspalum reimarioides Chapm., Fl. South. U. S. 665. 1883. Not *P. reimarioides* Brongn., 1830. West Florida [Chapman].
Paspalum vaginatum var. *reimarioides* Chapm., Fl. South. U. S. ed. 3. 577. 1897. Presumably based on *P. reimarioides* Chapm.
Paspalum distichum var. *nanum* Stapf in Dyer, Fl. Cap. 7: 371. 1898. Based on *P. vaginatum* var. *nanum* Doell.
Sanguinaria vaginata Bubani, Fl. Pyr. 4: 258. 1901. Based on *Paspalum vaginatum* Swartz.
(42) *Paspalum virgatum* L., Syst. Nat. ed. 10. 2: 855. 1759. Jamaica.
Paspalum virgatum var. *linneanum* Flügge, Monogr. Pasp. 190. 1810. Based on *P. virgatum* L.
Paspalum virgatum var. *jacquinianum* Flügge, Monogr. Pasp. 190. 1810. West Indies, Jacquin.
Paspalum virgatum var. *willdenowianum*

Flügge, Monogr. Pasp. 190. 1810. Pará, Brazil.

Paspalum virgatum var. *stramineum* Griseb., Fl. Brit. W. Ind. 543. 1864. Antigua, Wulfschlaegel [the other specimen cited belongs to *P. arundinaceum* Poir.].

Paspalum leucocheilum Wright, An. Acad. Cienc. Habana 8: 203. 1871; Fl. Cub. 194. 1873. Isla de Pinos, Blain.

Paspalum virgatum var. *ciliatum* Doell in Mart., Fl. Bras. 2: 88. 1877. Based on *P. virgatum* var. *linneanum* Flügge.

- (29) *Paspalum virletii* Fourn. Mex. Pl. 2: 12. 1886. San Luis Potosí, Mexico, "Virlet 1329" [error for 1319].

(144) **PENNISETUM** L. Rich.

Pennisetum alopecuroides (L.) Spreng., Syst. Veg. 1: 303. 1825. Based on *Panicum alopecuroides* L.

Panicum alopecuroides L., Sp. Pl. 55. 1753. China.

Pennisetum ciliare (L.) Link, Hort. Berol. 1: 213. 1827. Based on *Cenchrus ciliaris* L.

Cenchrus ciliaris L., Mant. Pl. 2: 302. 1771. Cape of Good Hope, Africa, Koenig.

- (6) **Pennisetum clandestinum** Hochst. ex Chiov., Ann. Ist. Bot. Roma 8: 41. 1903. Abyssinia.

Pennisetum longistylum var. *clandestinum* Leeke, Ztschr. Naturwiss. 79: 23. 1907. Based on *P. clandestinum* Hochst.

- (1) **Pennisetum glaucum** (L.) R. Br., Prodr. Fl. Nov. Holl. 1: 195. 1810. Based on *Panicum glaucum* L.

Panicum glaucum L., Sp. Pl. 56. 1753.²³ India.

Holcus spicatus L., Syst. Nat. ed. 10. 2: 1305. 1759. India.

Pennisetum typhoideum L. Rich. in Pers., Syn. Pl. 1: 72. 1805. Based on *Holcus spicatus* L.

Penicillaria spicata Willd., Enum. Pl. 1037. 1809. Based on *Holcus spicatus* L.

Setaria glauca Beauv., Ess. Agrost. 51, 178. 1812. Based on *Panicum glaucum* L., but misapplied to *S. lutescens* (Weig.) Hubb.

Pennisetum spicatum Willd. ex Roem. and Schult., Syst. Veg. 2: 499. 1817, as synonym of *Penicillaria spicata* Willd. Koern., in Koern. and Wern., Handb. Getreidebau. 1: 284. 1885. Based on *Holcus spicatus* L.

Panicum spicatum Roxb., Fl. Ind. 1: 286. 1820. Based on *Holcus spicatus* L.

Penicillaria typhoidea Fig. and DeNot., Agrost. Egypt. Frag. 55. 1853. Based on *Pennisetum typhoideum* "Delile" (same as L. Rich.).

Chamaeraphis glauca Kuntze, Rev. Gen.

²³ For discussion of this name see Chase, Amer. Jour. Bot. 8: 41-49. 1921.

- Pl. 2: 767. 1891. Based on *Panicum glaucum* L., but misapplied to *Setaria lutescens* (Weig.) Hubb.
- Pennisetum spicatum* var. *typhoideum* Dur. and Schinz, Consp. Fl. Afr. 5: 785. 1894. Based on *Penicillaria typhoidea* Fig. and DeNot.
- Ixophorus glaucus* Nash, Torrey Bot. Club Bul. 22: 423. 1895. Based on *Panicum glaucum* L., but misapplied to *Setaria lutescens* (Weig.) Hubb.
- Chaetochloa glauca* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 4: 39. 1897. Based on *Panicum glaucum* L., but misapplied to *Setaria lutescens* (Wieg.) Hubb.
- Pennisetum americanum* Schum. (in Engl. Pflanzenw. Ost-Afr. 5B: 51. 1895), based on *Panicum americanum* L. (Sp. Pl. 56. 1753) has been used for this species, but the Linnaean name was based on an unidentifiable figure in Clusius (Rar. Pl. Hist. 2: 215. 1601).
- Pennisetum latifolium* Spreng., Syst. Veg. 1: 302. 1825. Montevideo, Sello.
- Pennisetum macrostachyum* (Brongn.) Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 1: 177. 1834. Based on *Gymnothrix macrostachys* Brongn.
- Gymnothrix macrostachys* Brongn. in Duperrey, Bot. Voy. Coquille 2^e: 104. pl. 10. 1830. Moluccas.
- (3) *Pennisetum nervosum* (Nees) Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 1: 177. 1834. Based on *Gymnothrix nervosa* Nees.
- Gymnothrix nervosa* Nees, Agrost. Bras. 277. 1829. Bahia, Brazil.
- Cenchrus nervosus* Kuntze, Rev. Gen. Pl. 3^e: 347. 1898. Based on *Gymnothrix nervosa* Nees.
- Pennisetum purpureum* Schumach., Beskr. Guin. Pl. 64. 1827. Guinea, Africa.
- (5) *Pennisetum setaceum* (Forsk.) Chiov., Soc. Bot. Ital. Bul. 1923: 113. 1923. Based on *Phalaris setacea* Forsk.
- Phalaris setacea* Forsk., Fl. Aegypt. Arab. 17. 1775. Arabia.
- Pennisetum ruppelii* Steud., Syn. Pl. Glum. 1: 107. 1854. Abyssinia.
- (2) *Pennisetum setosum* (Swartz) L. Rich. in Pers., Syn. Pl. 1: 72. 1805. Based on *Cenchrus setosus* Swartz.
- Cenchrus setosus* Swartz, Prodr. Veg. Ind. Occ. 26. 1788. West Indies.
- Panicum cenchroides* L. Rich., Act. Soc. Hist. Nat. (Paris) 1: 106. 1792. French Guiana, Leblond.
- Panicum erubescens* Willd., Enum. Hort. Berol. 1031. 1809. St. Thomas.
- Setaria erubescens* Beauv., Ess. Agrost. 51, 169, 178. 1812. Based on *Panicum erubescens* Willd.
- Pennisetum purpurascens* H. B. K., Nov. Gen. et Sp. 1: 113. 1815. Jorullo, Mexico, Humboldt and Bonpland.
- Pennisetum uniflorum* H. B. K., Nov. Gen. et Sp. 1: 114. pl. 34. 1815. Venezuela, Humboldt and Bonpland.
- Setaria cenchroides* Roem. and Schult., Syst. Veg. 2: 495. 1817. Based on *Panicum cenchroides* L. Rich.
- Gymnothrix geniculata* Schult., Mantissa 2: 284. 1824. Martinique, Sieber.
- Pennisetum alopecuroides* Desv. ex Hamilt., Prodr. Pl. Ind. Occ. 11. 1825. Not *P. alopecuroides* Spreng., 1825. West Indies.
- Pennisetum erubescens* Link, Hort. Berol. 1: 215. 1827. Based on *Panicum erubescens* Willd.
- Pennisetum hirsutum* Nees, Agrost. Bras. 284. 1829. Brazil [Martius].
- Pennisetum pallidum* Nees, Agrost. Bras. 285. 1829. Minas Geraes, Brazil, [Martius].
- Pennisetum richardi* Kunth, Rév. Gram. 1: 49. 1829. Based on *Panicum cenchroides* L. Rich.
- Pennisetum sieberi* Kunth, Rév. Gram. 1: 50. 1829. Based on *Gymnothrix geniculata* Schult.
- Pennisetum flavescens* Presl, Rel. Haenk. 1 316. 1830. Mexico, Haenke.
- Pennisetum hamiltonii* Steud., Nom. Bot. ed. 2. 2: 297. 1841. Based on *P. alopecuroides* Desv. ex Hamilt.
- Pennisetum nicaraguense* Fourn., Soc. Bot. France Bul. II. 27: 293. 1880. Granada, Nicaragua, Levy 1304.
- Pennisetum indicum* var. *purpurascens* Kuntze, Rev. Gen. Pl. 2: 787. 1891. Based on *Pennisetum purpurascens* H. B. K.
- (4) *Pennisetum villosum* R. Br. in Salt, Voy. Abyss. App. 62. 1814, name only; in Fres., Mus. Senckenb. Abh. 2: 134. 1837. Abyssinia.
- Cenchrus villosus* Kuntze, Rev. Gen. Pl. 3^e: 347. 1898. Not *C. villosus* Spreng., 1825. Based on *Pennisetum villosum* R. Br.

(118) PHALARIS L.

- (6) *Phalaris angusta* Nees ex Trin., Gram. Icon. 1: pl. 78. 1827. Uruguay and southern Brazil.
- Phalaris ludoviciana* Torr. ex Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 3^e: 56. 1839, as synonym of *P. angusta* Nees.
- Phalaris laxa* Spreng. ex Steud., Nom. Bot. ed. 2. 2: 315. 1841, as synonym of *P. angusta* Nees.
- Phalaris intermedia* var. *angusta* Chapm., Fl. South. U. S. 569. 1860. Based on *P. angusta* Nees.
- Phalaris intermedia* var. *angustata* Beal, Grasses N. Amer. 2: 182. 1896. "*P. angustata* Hort." [San Diego] Calif., Pringle in 1882.
- (9) *Phalaris arundinacea* L., Sp. Pl. 55. 1753. Europe. (*P. arundinacea* Michx., listed in Index Kewensis, is the Linnaean species.)

- Arundo colorata* Ait., Hort. Kew. 1: 116. 1789. Based on *Phalaris arundinacea* L.
- Typhoides arundinacea* Moench, Meth. Pl. 202. 1794. Based on *Phalaris arundinacea* L.
- Calamagrostis variegata* With., Bot. Arr. Veg. Brit. ed. 3. 2: 124. 1796. Based on *Phalaris arundinacea* L.
- Arundo riparia* Salisb., Prodr. Stirp. 24. 1796. Based on *Phalaris arundinacea* L.
- Baldingera colorata* Gaertn., Mey., and Scherb., Fl. Wett. 1: 96. 1799. Based on *Phalaris arundinacea* L.
- Digraphis arundinacea* Trin., Fund. Agrost. 127. 1820. Based on *Phalaris arundinacea* L.
- Baldingera arundinacea* Dum., Obs. Gram. Belg. 130. pl. 10. f. 40. 1823. Based on *Phalaris arundinacea* L.
- Digraphis americana* Ell. ex Loud., Hort. Brit. 27. 1830. No description, *Phalaris arundinacea* Michx. cited, Loudon assuming the American form to be distinct from the European and that *Phalaris americana* Ell. was the same as the American *P. arundinacea*.
- Endallex arundinacea* Raf. ex Jacks., Ind. Kew. 1: 839. 1893, as synonym of *Phalaris arundinacea* L.
- PHALARIS ARUNDINACEA var. PICTA L., Sp. Pl. 55. 1753. Europe.
- Phalaris americana* var. *picta* Eaton and Wright, N. Amer. Bot. ed. 8. 352. 1840. Massachusetts, Connecticut, New York, Ontario.
- Phalaris arundinacea* var. *variegata* Parnell, Grasses Brit. 188. pl. 82. 1845. Scotland.
- Digraphis arundinacea* var. *picta* Pacher, Jahrb. Nat. Landesmus. Kärnt. 14: 119. 1880. Presumably based on *Phalaris arundinacea* var. *picta* L.
- (3) *Phalaris brachystachys* Link, Neu. Jour. Bot. Schrad. 1³: 134. 1806. Based on *P. canariensis* as described by Brotero (Fl. Lusit. 1: 79. 1804). Portugal.
- Phalaris canariensis* var. *brachystachys* Fedtsch., Jard. Bot. Prin. U. R. S. S. [Pierre le Grand] Bul. 14 (sup. 2): 47. 1915. Based on *P. brachystachys* Link.
- (8) *Phalaris californica* Hook. and Arn., Bot. Beechey Voy. 161. 1841. California. This is the species referred to *P. amethystina* Trin., of Chile, by Thurber and others.
- (2) *Phalaris canariensis* L., Sp. Pl. 54. 1753. Southern Europe and the Canary Islands.
- Phalaris avicularis* Salisb., Prodr. Stirp. 17. 1796. Based on *P. canariensis* L.
- (5) *Phalaris caroliniana* Walt., Fl. Carol. 74. 1788. South Carolina.
- Phalaris intermedia* Bosc. ex Poir. in Lam., Encycl. Sup. 1: 300. 1810. Carolina, Bosc.
- Phalaris microstachya* DC., Cat. Hort. Monsp. 131. 1813. South Carolina, Fraser; Bosc.
- Phalaris americana* Ell., Bot. S. C. and Ga. 1: 101. pl. 5. f. 4. 1816. South Carolina.
- Phalaris occidentalis* Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 144. 1837. Fort Smith, Ark., on the Arkansas to Red River [Nuttall].
- Phalaris trivialis* Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 3¹: 55. 1839. Charleston, S. C., Beyrich.
- Phalaris intermedia* var. *microstachya* Vasey ex L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 512. 1894. Based on *P. microstachya* DC.
- (7) *Phalaris lemmoni* Vasey, U. S. Natl. Herb. Contrib. 3: 42. 1892. Santa Cruz, Calif., Lemmon.
- (4) *Phalaris minor* Retz., Obs. Bot. 3: 8. 1783. Orient.
- (1) *Phalaris paradoxa* L., Sp. Pl. ed. 2. 2: 1665. 1763. Mediterranean region.
- PHALARIS PARADOXA var. PRAEMORSA (Lam.) Coss. and Dur., Expl. Sci. Alger. 2: 25. 1854. Based on *P. praemorsa* Lam.
- Phalaris praemorsa* Lam., Fl. Franç. 3: 566. 1778. France.
- Phalaris tuberosa* L., Mant. Pl. 2: 557. 1771. Europe.
- PHALARIS TUBEROSA var. STENOPTERA (Hack.) Hitchc., Wash. Acad. Sci. Jour. 24: 292. 1934. Based on *P. stenoptera* Hack.
- Phalaris stenoptera* Hack., Repert. Sp. Nov. Fedde 5: 333. 1908. Melbourne, Australia, Ewart, cultivated. This species has been referred to *P. bulbosa* (see under *Phleum subulatum*).

(125) PHARUS L.

- (1) *Pharus parvifolius* Nash, Torrey Bot. Club Bul. 35: 301. 1908. Haiti, Nash and Taylor 1482.
- This is the species described under *Pharus latifolius* L. by Chapman.

(72) PHIPPSIA (Trin.) R. Br.

- (1) *Phippsia algida* (Phipps) R. Br., Chlor. Melv. 27. 1823. Based on *Agrostis algida* Phipps.
- Agrostis algida* Phipps, Voy. 200. 1774. Arctic regions.
- Trichodium algidum* Roem. and Schult., Syst. Veg. 2: 283. 1817. Based on *Agrostis algida* Wahl. [The same as *A. algida* Phipps.]
- Colpodium monandrum* Trin. in Spreng., Neu. Entd. 2: 37. 1821. Based on *Agrostis algida* Phipps.
- Vilfa algida* Trin., Gram. Unifl. 159. 1824. Based on *Agrostis algida* Phipps.
- Vilfa monandra* Trin., Gram. Unifl. 159. 1824. "Sin. Laurentii" [probably St. Lawrence Island, Alaska], Chamisso.
- Phippsia monandra* Trin., Gram. Unifl.

159. 1824, as synonym of *Vilfa monandra* Trin.; Hook. and Arn., Bot. Beechey Voy. 132. 1841. Based on *Vilfa monandra* Trin.

Catabrosa algida Fries, Nov. Fl. Suec. Mant. 3: Add. 173, 174. 1843. Based on *Agrostis algida* Phipps.

Poa algida Rupr., Fl. Samoj. Cisural. 61. 1845. Not *P. algida* Trin. Based on *Agrostis algida* Phipps.

(79) PHLEUM L.

(2) *Phleum alpinum* L., Sp. Pl. 59. 1753. Europe.

Phleum haenkeanum Presl, Rel. Haenk. 1: 245. 1830. Nootka Sound, Vancouver Island, *Haenke*.

Phleum pratense var. *alpinum* Celak., Prodr. Fl. Böhm. 38. 1869. Based on *P. alpinum* L.

Phleum alpinum var. *americanum* Fourn., Mex. Pl. 2: 90. 1886. Nootka Sound, Vancouver Island, *Haenke*.

Phleum alpinum var. *scribnerianum* Pammel, Davenport Acad. Sci. Proc. 7: 238. 1899. Geranium Park, Wyo., *Pammel* 6.

Plantinia alpina Bubani, Fl. Pyr. 4: 272. 1901. Based on *Phleum alpinum* L.

Phleum arenarium L., Sp. Pl. 60. 1753. Europe.

Phleum paniculatum Huds., Fl. Angl. 23. 1762. England.

Phalaris aspera Retz., Obs. Bot. 4: 14. 1786. Europe.

Phleum asperum Jacq., Col. Bot. 1: 110. 1786. Europe.

Plantinia aspera Bubani, Nuov. Gior. Bot. Ital. 5: 317. 1873. Based on *Phleum asperum* L. (error for Jacq.)

(1) *Phleum pratense* L., Sp. Pl. 59. 1753. Europe.

Phleum nodosum var. *pratense* St. Amans, Fl. Agen. 23. 1821. Based on *P. pratense* L.

Plantinia pratensis Bubani, Fl. Pyr. 4: 270. 1901. Based on *Phleum pratense* Huds. (error for L.).

Stelephurus pratensis Lunell, Amer. Midl. Nat. 4: 216. 1915. Based on *Phleum pratense* L.

Phleum subulatum (Savi) Aschers. and Graebn., Syn. Mitteleur. Fl. 2: 154. 1899. Based on *Phalaris subulata* Savi.

Phalaris bulbosa L., Cent. Pl. 1: 4. 1755; Amoen. Acad. 4: 264. 1759. Not *Phleum bulbosum* Gouan, 1765. "In Oriente."

Phalaris subulata Savi, Fl. Pis. 1: 57. 1798. Italy.

Phalaris bellardi Willd., Ges. Naturf. Freund. Berlin Neue Schrift. 3: 415. 1801. Europe.

Phalaris tenuis Host, Gram. Austr. 2: 27. pl. 36. 1802. Europe.

Phleum tenue Schrad., Fl. Germ. 1: 191. 1806. Based on *Phalaris tenue* Host.

Phleum bellardi Willd., Enum. Pl. 1: 85.

1809. Based on *Phalaris bellardi* Willd. *Phleum bulbosum* Richt., Pl. Eur. 1: 37. 1890. Not *P. bulbosum* Gouan, 1765. Based on *Phalaris bulbosa* L.

(28) PHRAGMITES Trin.

(1) *Phragmites communis* Trin., Fund. Agrost. 134. 1820. Based on *Arundo phragmites* L.

Arundo phragmites L., Sp. Pl. 81. 1753. Europe.

Arundo vulgaris Lam., Fl. Franç. 3: 615. 1778. Based on *A. phragmites* L. The name is untenable.

Arundo palustris Salisb., Prodr. Stirp. 24. 1796. Based on *A. phragmites* L.

Reimaria diffusa Spreng., Neu. Entd. 3: 14. 1822. Martinique, *Sieber* [31].

Cynodon phragmites Raspail, Ann. Sci. Nat., Bot. 5: 302. 1825. Based on *Arundo phragmites* L.

Phragmites vulgaris Crép., Man. Fl. Belg. ed. 2. 345. 1866. Based on *Arundo vulgaris* Lam., an untenable name.

Phragmites berlandieri Fourn., Soc. Bot. France Bul. 24: 178. 1877. Laredo, Tex., *Berlandier* 1446.

Phragmites phragmites Karst., Deut. Fl. 379. 1883. Based on *Arundo phragmites* L.

Trichoon phragmites Rendle, Cat. Afr. Pl. Welw. 2¹: 218. 1899. Based on *Arundo phragmites* L.

Oxyanthe phragmites Nieuwl., Amer. Midl. Nat. 3: 332. 1914. Based on *Arundo phragmites* L.

Phragmites communis var. *berlandieri* Fernald, Rhodora 34: 211. 1925. Based on *P. berlandieri* Fourn.

Phragmites maximus var. *berlandieri* Moldenke, Torreya 36: 93. 1936. Based on *P. berlandieri* Fourn.

PHYLLOSTACHYS Sieb. and Zucc.

Phyllostachys aurea A. and C. Riviere, Soc. Acclim. Bul. III. 5: 716. f. 36. 1878. Hamma, Tunis.

Phyllostachys bambusoides Sieb. and Zucc., Abh. Bayer. Akad. Wiss. 3³: 746. pl. 5. f. 3. 1843. Japan.

(90) PIPTOCHAETIUM Presl

(1) *Piptochaetium fimbriatum* (H. B. K.) Hitchc., Wash. Acad. Sci. Jour. 23: 453. 1933. Based on *Stipa fimbriata* H. B. K.

Stipa fimbriata H. B. K., Nov. Gen. et Sp. 1: 126. 1815. Guanajuato, Mexico, *Humboldt* and *Bonpland*.

Milium mexicanum Spreng., Syst. Veg. 1: 251. 1825. Mexico, *Humboldt*.

Piptatherum mexicanum Schult., Mantissa 3 (Add. 1): 564. 1827. Based on *Milium mexicanum* Spreng.

Avena stipoides Willd. ex Steud., Nom. Bot. ed. 2. 2: 146. 1841, as synonym of *Milium mexicanum* Spreng.

Oryzopsis fimbriata Hemsl., Biol. Centr. Amer. Bot. 3: 538. 1885. Based on *Stipa fimbriata* H. B. K.

Oryzopsis seleri Pilger, Verh. Bot. Ver. Brand. 51: 192. 1909. Guatemala, *Seler* 3238.

Piptochaetium fimbriatum var. *confine* I. M. Johnston, Arnold Arb. Jour. 24: 396. 1943. Coahuila, Mexico, *Johnston* and *Muller* 486.

(10) PLEUROPOGON R. Br.

- (1) **Pleuropogon californicus** (Nees) Benth. ex Vasey, Grasses U. S. 40. 1883. Based on *Lophochlaena californica* Nees. *Lophochlaena californica* Nees, Ann. Nat. Hist. 1: 283. 1838. California [*Douglas*].

Pleuropogon douglasii Trin. ex Steud., Nom. Bot. ed. 2. 2: 355. 1841. Name only, North America.

Lepitoma brevifolia Torr. ex Steud., Nom. Bot. ed. 2. 2: 355. 1841, as synonym of *Pleuropogon douglasii* Trin.

- (4) **Pleuropogon davyi** Benson, Amer. Jour. Bot. 28: 360. 1941. Kelseyville, Calif., *Benson* 3666.

- (3) **Pleuropogon hooverianus** (Benson) J. T. Howell, West. Bot. Leaflets 4: 247. 1946. Based on *P. refractus* var. *hooverianus* Benson.

Pleuropogon refractus var. *hooverianus* Benson, Amer. Jour. Bot. 28: 360. 1941. Mendocino County, Calif., *Davy* 6626.

- (5) **Pleuropogon oregonus** Chase, Wash. Acad. Sci. Jour. 28: 52. f. 1. 1938. Union, Oreg., *Leckenby* in 1901.

- (2) **Pleuropogon refractus** (A. Gray) Benth. ex Vasey, Grasses U. S. 40. 1883. Based on *Lophochlaena refracta* A. Gray.

Lophochlaena refracta A. Gray, Amer. Acad. Sci. Proc. 8: 409. 1872. Oregon [*Hall* 636].

(12) POA L.

- (45) **Poa alpina** L., Sp. Pl. 67. 1753. Lapland.

Urolepis mutica Fourn., Mex. Pl. 2: 110. 1886. Not *U. mutica* Fourn. ex Hemsl. 1885. Mexico, *Liebmann* 611.

Poa alpina var. *minor* Scribn. in Beal, Grasses N. Amer. 2: 543. 1896. Not *P. alpina* var. *minor* Koch, 1837. Montana, *Scribner* [388] in 1883.

- (25) **Poa alsodes** A. Gray, Man. ed. 2. 562. 1856. New England to Wisconsin. [Type, New Hampshire.]

Poa dinantha Wood, Class-book ed. 1861. 797. 1861. Montgomery, Ala.

This species was described as *Poa nemoralis* L., in Torr., Fl. North. and Mid. U. S. 1: 111. 1823.

- (69) **Poa ampla** Merr., Rhodora 4: 145. 1902. Steptoe, Wash., *G. R. Vasey* 3009.

Poa laeviculmis Williams, Bot. Gaz. 36: 55. 1903. Several specimens from Washington and Oregon mentioned, the first being Steptoe, Wash., *G. R. Vasey* 3026.

Poa truncata Rydb., Torrey Bot. Club Bul. 32: 607. 1905. Dillon, Colo., *Clements* 373.

Poa confusa Rydb., Torrey Bot. Club Bul. 32: 607. 1905. Medicine Bow Mountains, Wyo., *Nelson* 7787.

- (5) **Poa annua** L., Sp. Pl. 68. 1753. Europe. *Aira pumila* Pursh, Fl. Amer. Sept. 1: 76. 1814. Pennsylvania.

Poa infirma H. B. K., Nov. Gen. et Sp. 1: 158. 1816. Colombia, *Humboldt* and *Bonpland*.

Megastachya infirma Roem. and Schult., Syst. Veg. 2: 585. 1817. Based on *Poa infirma* H. B. K.

Catabrosa pumila Roem. and Schult., Syst. Veg. 2: 696. 1817. Based on *Aira pumila* Pursh.

Poa aestivalis Presl, Rel. Haenk. 1: 272. 1830. Peru, *Haenke*.

Eragrostis infirma Steud., Nom. Bot. ed. 2. 1: 563. 1840. Based on *Poa infirma* H. B. K.

Poa annua var. *aquatica* Aschers., Fl. Prov. Brandenb. 1: 844. 1864. Germany.

Poa annua var. *rigidiuscula* L. H. Dewey, U. S. Natl. Herb. Contrib. 3: 262. 1895. Nez Perce County, Idaho, *Sandberg* 134.

- (7) **Poa arachnifera** Torr. in Marcy, Expl. Red Riv. 301. 1853. Headwaters of the Trinity River [Ark., *Marcy Exped.*].

Poa densiflora Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 96. 1862. Northern Texas.

Poa arachnifera var. *glabrata* Vasey, Grasses U. S. Descr. Cat. 79. 1885, name only, [for staminate plants with glabrous spikelets]; Vasey ex Beal, Grasses N. Amer. 2: 535. 1896. [Texas, *Buckley* in 1881.]

Poa glabrescens Nash in Small, Fl. Southeast. U. S. 154, 1327. 1903. Based on *P. arachnifera* var. *glabrata* Torr. (error for Vasey).

- (22) **Poa arctica** R. Br., Sup. App. Parry's Voy. 288 (err. typ. 188). 1823. Melville Island, Arctic America, *Parry*.

Poa grayana Vasey, U. S. Natl. Herb. Contrib. 1: 272. 1893. Grays Peak, Colo., *Patterson* 14 in 1885.

Poa laxa occidentalis Vasey ex Rydb. and Shear, U. S. Dept. Agr., Div. Agrost. Bul. 5: 32. 1897. Name only, for *Shear* 690 and *Rydberg* 2440, Grays Peak, Colo.

Poa longipila Nash in Rydb., N. Y. Bot. Gard. Mem. 1: 46. 1900. Electric Peak, Yellowstone Park, *Rydberg* 3614.

Poa alpicola Nash in Rydb., N. Y. Bot. Gard. Mem. 1: 47. 1900. Based on *P.*

- laxa* Haenke as misapplied by Thurber (in Watson, Bot. Calif. 2: 312. 1880).
- Poa williamsii* Nash, N. Y. Bot. Gard. Bul. 2: 156. 1901. White Pass, Alaska, *Williams* in 1899.
- Poa aperta* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 35: 4. 1901. Telluride, Colo., *Shear* 98.
- Poa callichroa* Rydb., Torrey Bot. Club Bul. 32: 603. 1905. Dead Lake, near Pikes Peak, Colo., *Clements* 457.
- Poa phoenicea* Rydb., Torrey Bot. Club Bul. 32: 605. 1905. Pikes Peak Valley, Colo., *Clements* 466.
- Poa tricholepis* Rydb., Torrey Bot. Club Bul. 32: 606. 1905. Pagosa Peak, Colo., *Baker* 210.
- Poa chionogenes* Gandoger, Soc. Bot. France Bul. 667: 302. 1920. Grays Peak, Colo., *Crandall* [in 1898].
- Colorado specimens of this species have been described as *Poa cenisia* All. by American authors.
- (20) *Poa arida* Vasey, U. S. Natl. Herb. Contrib. 1: 270. 1893. Socorro, N. Mex., *G. R. Vasey* in 1881.
- Poa andina* Nutt. ex S. Wats. in King, Geol. Expl. 40th Par. 388. 1871. Not *P. andina* Trin., 1836. "Colorado, East and West Humboldt Mountains and in Clover Mountains, Nevada; also in the Trinity Mountains, Watson 1319." The name is given as *P. andina* "Nutt., Ms. in Herb.; (not of Trin.)."
- Poa californica* Munro ex Coulter, Man. Rocky Mount. 420. 1885. Not *P. californica* Steud., 1854. Based on *P. andina* Nutt.
- Poa andina* var. *purpurea* Vasey ex Macoun, Can. Pl. Cat. 24: 223. 1888. Name only, for *Macoun* 92, Red Deer Lakes, Alberta.
- Poa sheldoni* Vasey, U. S. Natl. Herb. Contrib. 1: 276. 1893. Buena Vista, Colo., *Sheldon* 615.
- Poa pseudopratensis* Scribn. and Rydb., U. S. Natl. Herb. Contrib. 3: 531. pl. 20. 1896. Not *P. pseudopratensis* Beyer, 1819. Hot Springs, S. Dak., *Rydberg* 1151.
- Poa pratericola* Rydb. and Nash, N. Y. Bot. Gard. Mem. 1: 51. 1900. Based on *P. arida* Vasey.
- Poa fendleriana* var. *arida* Jones, West. Bot. Contrib. 14: 14. 1912. Based on *P. arida* Vasey, not *P. pratensis* var. *arida* Parnell, 1842.
- Poa pratensis* var. *pseudopratensis* Jones, West. Bot. Contrib. 14: 15. 1912. Based on *P. pseudopratensis* Scribn. and Rydb.
- Paneion aridum* Lunell, Amer. Midl. Nat. 4: 222. 1915. Based on *Poa arida* Vasey.
- Paneion pratericola* Lunell, Amer. Midl. Nat. 4: 223. 1915. Based on *Poa pratericola* Rydb. and Nash.
- Poa pratensisformis* Rydb., Fl. Rocky Mount. 79. 1917. Based on *P. pseudopratensis* Scribn. and Rydb.
- Poa overi* Rydb., Brittonia 1: 84. 1931. Custer County, S. Dak., *Over* 18100.
- (13) *Poa atropurpurea* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 11: 53. pl. 10. 1898. Bear Valley, San Bernardino Mountains, Calif., *Parish* 2968.
- (44) *Poa autumnalis* Muhl. ex Ell., Bot. S. C. and Ga. 1: 159. 1816. Columbia, S. C., *Herbemont*.
- Poa flexuosa* Muhl., Descr. Gram. 148. 1817. Not *P. flexuosa* Smith, 1800. Virginia, Carolina, and Cherokee [Tennessee]. Name only, Muhl. Cat. Pl. 11. 1813.
- Poa campyle* Schult., Mantissa 2: 304. 1824. Based on *P. flexuosa* Muhl.
- Poa elliotii* Spreng., Syst. Veg. 1: 338. 1825. Based on *P. autumnalis* Muhl.
- Poa vestita* Bosc. ex Steud., Nom. Bot. ed. 2. 2: 363. 1841. Name only. Carolina.
- Poa hexantha* Wood, Class-book ed. 1861. 797. 1861. Atlanta, Ga.
- (3) *Poa bigelovii* Vasey and Scribn. in Vasey, Grasses U. S. Descr. Cat. 81. 1885. Based on *P. annua* var. *stricta* Vasey.
- Poa annua* var. *stricta* Vasey, Torrey Bot. Club Bul. 10: 31. 1883. Rillita River, Ariz., *Pringle*.
- (1) *Poa bolanderi* Vasey, Bot. Gaz. 7: 32. 1882. [Yosemite National Park] Calif., *Bolander* 6115.
- Poa howellii chandleri* Davy, Calif. Univ. Pubs., Bot. 1: 60. 1902. Siskiyou County, Calif., *Chandler* 1703.
- Poa bolanderi chandleri* Piper, U. S. Natl. Herb. Contrib. 11: 132. 1906. Based on *P. howellii chandleri* Davy.
- Poa horneri* St. John, Fl. Southeast. Wash. and Adj. Idaho 54. 1937. Columbia County, Wash., *Darlington* in 1913.
- (36) *Poa bulbosa* L., Sp. Pl. 70. 1753. France.
- Poa bulbosa* var. *vivipara* Koel., Descr. Gram. 189. 1802. Europe.
- Paneion bulbosum* var. *viviparum* Lunell, Amer. Midl. Nat. 4: 222. 1915. Based on *Poa bulbosum* var. *vivipara* Koch (same as Koel.).
- (65) *Poa canbyi* (Scribn.) Piper, U. S. Natl. Herb. Contrib. 11: 132. 1906. Based on *Glyceria canbyi* Scribn.
- Aira brevifolia* Pursh, Fl. Amer. Sept. 1: 76. 1814. Not *Poa brevifolia* DC., 1806. Plains of the Missouri, *Lewis*.
- Airopsis brevifolia* Roem. and Schult., Syst. Veg. 2: 578. 1817. Based on *Aira brevifolia* Pursh.
- Poa tenuifolia* Nutt. in S. Wats. in King, Geol. Expl. 40th Par. 5: 387. 1871. Not *P. tenuifolia* L. Rich., 1851. Nevada, *Watson* 1318.
- Poa tenuifolia* var. *rigida* Vasey in Rothr., in Wheeler, U. S. Survey W. 100th

- Merid. Rpt. 6: 290. 1878. Name only. Nevada and Colorado [Wolf] 1138, 1140.
- Poa tenuifolia* var. *elongata* Vasey in Rothr., in Wheeler, U. S. Survey W. 100th Merid. Rpt. 6: 290. 1878. Nevada, Colorado [Twin Lakes, Wolf] 1141.
- Glyceria canbyi* Scribn., Torrey Bot. Club Bul. 10: 77. 1883. Cascade Mountains, Wash., *Tweedy* and *Brandegee* in 1882.
- Aira missurica* Spreng. ex Jacks., Ind. Kew. 1: 68. 1893, as synonym of *A. brevifolia* Pursh, erroneously credited to "Spreng. Syst. 2: 578." *Aira brevifolia* Pursh is given in Spreng., Syst. 1: 276. 1825.
- Poa laevis* Vasey, U. S. Natl. Herb. Contrib., 1: 273. 1893. Not *P. laevis* R. Br., 1810. Montana, *Scribner* in 1883.
- Poa lucida* Vasey, U. S. Natl. Herb. Contrib., 1: 274. 1893. Georgetown, Colo., *Patterson* 73.
- Atropis laevis* Beal, Grasses N. Amer. 2: 577. 1896. Based on *Poa laevis* Vasey.
- Atropis laevis* var. *rigida* Beal, Grasses N. Amer. 2: 578. 1896. Utah, *Jones*.
- Atropis canbyi* Beal, Grasses N. Amer. 2: 580. 1896. Based on *Glyceria canbyi* Scribn.
- Poa laevigata* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 5: 31. 1897. Based on *P. laevis* Vasey.
- Poa wyomingensis* Scribn., Davenport Acad. Sci. Proc. 7: 242. 1899. Big Horn, Sheridan County, Wyo., *Pammel* 192.
- Poa leckenbyi* Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 9: 2. 1899. Scott, Klickitat County, Wash., *Leckenby* in 1898.
- Poa helleri* Rydb., Torrey Bot. Club Bul. 36: 534. 1909. Lake Waha, Idaho, *Heller* 3274.
- Poa buckleyana* var. *elongata* Jones, West. Bot. Contrib. 14: 14. 1912. Based on "*P. andina* var. *elongata* Vasey," error for *P. tenuifolia* var. *elongata* Vasey.
- Poa nevadensis* var. *laevigata* Jones, West. Bot. Contrib. 14: 14. 1912. Based on *P. laevigata* Scribn.
- Poa nevadensis* var. *leckenbyi* Jones, West. Bot. Contrib. 14: 14. 1912. Based on *P. leckenbyi* Scribn.
- (41) *Poa chaixii* Vill., Fl. Delph. 7. 1785. Dauphiné, France.
- (4) *Poa chapmaniana* Scribn., Torrey Bot. Club Bul. 21: 38. 1894. Knoxville, Tenn., *Scribner*. "*P. cristata* Chapm. not Walter" cited as synonym, but what Chapman described as *Poa cristata* Walt. is dubious. *Scribner's* description is ample, and the type is in the National Herbarium.
- (6) *Poa compressa* L., Sp. Pl. 69. 1753. Europe and North America.
- Poa compressa* var. *sylvestris* Torr., Fl. North. and Mid. U. S. 1: 110. 1823. New York.
- Poa compressa* forma *depauperata* Millsp., Fl. W. Va. 472. 1892. Monongalia, along Falling Run, W. Va.
- Panicum compressum* Lunell, Amer. Midl. Nat. 4: 222. 1915. Based on *Poa compressa* L.
- (10) *Poa confinis* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 13²: pl. 75. 1893. Oregon to Alaska [type Tillamook Bay, Oreg., *Howell* 69 in 1882].
- (14) *Poa curta* Rydb., Torrey Bot. Club Bul. 36: 534. 1909. Spread Creek [Jackson Hole], Wyo., *Tweedy* 13.
- (67) *Poa curtifolia* Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 16: 3. 1899. Mount Stuart, Wash., *Elmer* 1148 [type] and 1150.
- (53) *Poa cusickii* Vasey, U. S. Natl. Herb. Contrib., 1: 271. 1893. Oregon, *Cusick* 1219.
- Poa filifolia* Vasey, U. S. Natl. Herb. Contrib. 1: 271. 1893. Hatwai Creek, Nez Perce County, Idaho, *Sandberg* 138.
- Poa idahoensis* Beal, Grasses N. Amer. 2: 539. 1896. Based on *P. filifolia* Vasey, not *P. filifolia* Schur, that name, however, published as synonym only.
- Poa subaristata* Scribn. in Beal, Grasses N. Amer. 2: 533. 1896. Not *P. subaristata* Phil., 1896 [earlier than *P. subaristata* Scribn.]. Yellowstone Park, *Tweedy* 633.
- Poa scabrifolia* Heller, Torrey Bot. Club Bul. 24: 310. 1897. Based on *P. filifolia* Vasey.
- Poa spillmani* Piper, Erythea 7: 102. 1899. Douglas County, Wash., *Spillman* in 1896.
- Poa capillarifolia* Scribn. and Williams, U. S. Dept. Agr., Div. Agrost. Cir. 9: 1. 1899. California, *Hansen* 2614.
- Poa cottoni* Piper, Biol. Soc. Wash. Proc. 18: 146. 1905. Rattlesnake Mountains, Yakima County, Wash., *Cotton* 557.
- Poa nematophylla* Rydb., Torrey Bot. Club Bul. 32: 606. 1905. Meeker, Colo., *Osterhout* 2601.
- Poa scaberrima* Rydb., Torrey Bot. Club Bul. 36: 534. 1909. Beaver Canyon, Idaho, *Rydberg* 2055.
- (19) *Poa cuspidata* Nutt. in Barton, Compend. Fl. Phila. 1: 61. 1818. Based on *P. pungens* Nutt.
- Aira triflora* Ell., Bot. S. C. and Ga. 1: 153. 1816. Not *Poa triflora* Gilib., 1792. Athens, Ga., *Green*.
- Poa brevifolia* Muhl., Descr. Gram. 138. 1817. Not *P. brevifolia* DC., 1806. Pennsylvania. Name only, Muhl., Cat. Pl. 11. 1813.
- Poa trinervata* Willd. ex Muhl., Descr. Gram. 138. 1817, as synonym of *Poa brevifolia* Muhl.
- Poa pungens* Nutt., Gen. Pl. 1: 66. 1818.

- Not *P. pungens* Georgi, 1800, nor Bieb., 1808. Near Philadelphia.
- Poa brachyphylla* Schult., Mantissa 2: 304. 1824. Based on *P. brevifolia* Muhl.
- Triodia greenii* Spreng., Syst. Veg. 1: 330. 1825. Based on *Aira triflora* Ell.
- Grapphephorum elliottii* Kunth, Rév. Gram. 1: 80. 1829. Based on *Aira triflora* Ell.
- Grapphephorum melicoides* var. *triflorum* Wood, Amer. Bot. and Flor. pt. 2: 398. 1871. Based on *Aira triflora* Ell.
- (9) *Poa douglasii* Nees, Ann. Nat. Hist. 1: 284. 1838. California, Douglas.
- Brizopyrum douglasii* Hook. and Arn., Bot. Beechey Voy. Suppl. 404. 1840. Based on *Poa douglasii* Nees.
- Poa californica* Steud., Syn. Pl. Glum. 1: 261. 1854. California.
- (56) *Poa epilys* Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 9: 5. 1899. Buffalo Pass, Colo., Shear and Bessey 1457.
- Poa purpurascens* Vasey, Bot. Gaz. 6: 297. 1881. Not *P. purpurascens* Spreng., 1819. Mount Hood, Howell [in 1881].
- Poa alpina* var. *purpurascens* Beal, Grasses N. Amer. 2: 543. 1896. Based on *P. purpurascens* Vasey.
- Poa paddensis* Williams, U. S. Dept. Agr., Div. Agrost. Bul. 17 (ed. 2): 261 f. 557. 1901. Based on *P. purpurascens* Vasey.
- Poa subpurpurea* Rydb., Torrey Bot. Club Bul. 32: 606. 1905. Based on *P. purpurascens* Vasey.
- Poa purpurascens* var. *epilis* Jones, West. Bot. Contrib. 14: 14. 1912. Based on *P. epilys* Scribn.
- (42) *Poa fendleriana* (Steud.) Vasey, U. S. Dept. Agr., Div. Bot. Bul. 13²: pl. 74. 1893. Based on *Eragrostis fendleriana* Steud.
- Eragrostis fendleriana* Steud., Syn. Pl. Glum. 1: 278. 1854. "Mexico" [now New Mexico], Fendler 932.
- Uralepis poaeoides* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 94. 1862. New Mexico, Fendler 932.
- Atropis californica* Munro ex A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 336. 1862. California, Douglas in 1833.
- Poa eatoni* S. Wats. in King, Geol. Expl. 40th Par. 5: 386. 1871. Wasatch Mountains, Utah, Eaton [in 1869].
- Poa andina* var. *major* Vasey in Rothr., in Wheeler, U. S. Survey W. 100th Merid. Rpt. 6: 290. 1878. Arizona; Colorado.
- Poa andina* var. *spicata* Vasey in Rothr., in Wheeler, U. S. Survey W. 100th Merid. Rpt. 6: 290. 1878. Colorado. [Wolf] 1135.
- Atropis californica* Munro ex Thurb. in S. Wats., Bot. Calif. 2: 309. 1880. Near San Francisco, Bolander; Monterey, Hartweg.
- Poa californica* Scribn., Torrey Bot. Club Bul. 10: 31. 1883. Not *P. californica* Steud., 1854. Based on *Atropis californica* Munro.
- Panicularia fendleriana* Kuntze, Rev. Gen. Pl. 2: 782. 1891. Based on *Eragrostis fendleriana* Steud.
- Atropis fendleriana* Beal, Grasses N. Amer. 2: 576. 1896. Based on *Eragrostis fendleriana* Steud.
- Poa fendleriana spicata* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 5: 31. 1897. Based on *P. arida* var. *spicata* Vasey, error for *P. andina* var. *spicata* Vasey.
- Poa longepedunculata* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 11: 54. pl. 11. 1898. Laramie, Wyo., Nelson [3292].
- Poa brevipaniculata* Scribn. and Williams, U. S. Dept. Agr., Div. Agrost. Cir. 9: 2. 1899. Table Rock, Colo., Breninger 554.
- Poa scabriuscula* Williams, U. S. Dept. Agr., Div. Agrost. Cir. 10: 4. 1899. Glenwood, Utah, Ward 136.
- Poa longepedunculata viridescens* Williams, U. S. Dept. Agr., Div. Agrost. Cir. 10: 4. 1899. Sheep Mountain [near Laramie], Wyo., Williams 2302.
- Poa brevipaniculata subpallida* Williams, U. S. Dept. Agr., Div. Agrost. Cir. 10: 5. 1899. Rocky Mountains, Colo., Hall and Harbour 674 in part.
- Poa fendleriana arizonica* Williams, U. S. Dept. Agr., Div. Agrost. Cir. 10: 5. 1899. Yavapai Creek, Ariz., Rusby in 1883.
- (49) *Poa fernaldiana* Nannf., Symb. Bot. Upsal. 5: 50, 55. f. 6. pl. 4. 1935. Mount Washington, N. H., Williams and Robinson (Pl. exs. Grayanae No. 123).
- Poa laxa* var. *debiliior* Jones, West. Bot. Contrib. 14: 15. 1912. "The eastern plant," no particular locality or specimens cited.
- Described as *Poa laxa* Haenke in the Manual, ed. 1. That species is not known from America.
- (12) *Poa fibrata* Swallen, Wash. Acad. Sci. Jour. 30: 210. 1940. Grenada, Calif., Wheeler 3629.
- (47) *Poa glauca* Vahl, Fl. Dan. pl. 964. 1790. Norway.
- Poa caesia* J. E. Smith, Fl. Brit. 1: 103. 1800. England.
- Poa nemoralis* var. *glauca* Gaud., Agrost. Helv. 1: 182. 1811. Based on *P. glauca* Vahl.
- Poa glauca* var. *caesia* Hartm. Handb. Skand. Fl. ed. 1. 57. 1820. Based on *P. caesia* J. E. Smith.
- Paneion glaucum* Lunell, Amer. Midl. Nat. 4: 222. 1915. Based on *Poa glauca* Vahl.
- (48) *Poa glaucaantha* Gaudin, Alpina 3: 36. 1808. Switzerland. (Published as *P. glaucaanthos*.)
- Poa nemoralis* var. *glaucaantha* Reichenb.,

- Fl. Germ. 1: 47. 1830. Based on *P. glaucantha* Gaudin. (Referred to *P. nemoralis* L., as a variety but combination not made.) Reichenb., Icon. 1: pl. 86. f. 1644. 1834.
- Poa glauca* subsp. *glaucantha* Lindm., Bot. Not. 1926: 275. 1926. Based on *P. glaucantha* Gaudin.
- Poa tormentosa* Butters and Abbe, Rhodora 49: 14. pl. 1052. f. 7-9. 1947. Minnesota, *Butters, Burns, and Hendrickson* 2.
- Poa scopulorum* Butters and Abbe, Rhodora 49: 16. pl. 1051. f. 1-8. 1947. Cook County, Minn., *Butters and Abbe* 97.
- (21) *Poa glaucifolia* Scribn. and Williams, U. S. Dept. Agr., Div. Agrost. Cir. 10: 6. 1899. Based on *P. planifolia* Scribn. and Williams.
- Poa planifolia* Scribn. and Williams, U. S. Dept. Agr., Div. Agrost. Cir. 9: 3. 1899. Not *P. planifolia* Kuntze, 1898. Spring Creek, Big Horn Basin, Wyo., *Williams* 2814.
- Poa plattensis* Rydb., Brittonia 1: 84. 1931. Lawrence Fork, Nebr., *Rydberg* 461.
- (63) *Poa gracillima* Vasey, U. S. Natl. Herb. Contrib. 1: 272. 1893. Mount Adams, Wash., *Suksdorf* 33.
- Sporobolus bolanderi* Vasey, Bot. Gaz. 11: 337. 1886. Not *Poa bolanderi* Vasey, 1882. Multnomah Falls, Oreg., *Bolander*. [The type an overmature specimen from which all but the lowermost floret had fallen from the spikelets.]
- Atropis tenuifolia* var. *stenophylla* Vasey ex Beal, Grasses N. Amer. 2: 580. 1896. [Roseburg], Oreg., *Howell* in 1887.
- Poa saxatilis* Scribn. and Williams, U. S. Dept. Agr., Div. Agrost. Cir. 9: 1. 1899. Mount Rainier, Wash., *Piper* 1964.
- Poa tenerrima* Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 9: 4. 1899. California.
- Poa invaginata* Scribn. and Williams, U. S. Dept. Agr., Div. Agrost. Cir. 9: 6. 1899. Summit Camp, Sierra Nevada, Calif.
- Poa multnomae* Piper, Torrey Bot. Club Bul. 32: 435. 1905. Multnomah Falls, Oreg., *Piper* 6459.
- Poa alcea* Piper, Torrey Bot. Club Bul. 32: 436. 1905. Portland, Oreg., *Piper* 6463.
- Poa buckleyana* var. *stenophylla* Jones, West. Bot. Contrib. 14: 14. 1912. Based on *Atropis tenuifolia* var. *stenophylla* Vasey.
- Poa gracillima* var. *saxatilis* Hack., Allg. Bot. Ztschr. 21: 79. 1915. Based on *P. saxatilis* Scribn. and Williams.
- Poa englishii* St. John and Hardin, Mazama 11: 64. 1929. Mount Baker National Forest, *Hardin and English* 1391.
- (2) *Poa howellii* Vasey and Scribn., U. S. Dept. Agr., Div. Bot. Bul. 132: pl. 78. 1893. California to Oregon. [Portland, *Howell* 25 in 1881, type.]
- Poa howellii* var. *microsperma* Vasey, U. S. Natl. Herb. Contrib. 1: 273. 1893. Santa Cruz, Calif., *Anderson* 99.
- Poa bolanderi* var. *howellii* Jones, West. Bot. Contrib. 14: 15. 1912. Based on *P. howellii* Vasey and Scribn.
- (40) *Poa interior* Rydb., Torrey Bot. Club Bul. 32: 604. 1905. Headwaters of Clear Creek and Crazy Woman River, Wyo., *Tweedy* 3706.
- Poa coloradensis* Vasey ex Pammel, U. S. Dept. Agr., Div. Agrost. Bul. 9: 41. 1897. Name only, for a specimen collected by Pammel in Colorado in 1895-96.
- Poa subtrivialis* Rydb., Torrey Bot. Club Bul. 36: 536. 1909. Big Horn Mountains, Wyo., *Tweedy* 2141.
- Panemon interius* Lunell, Amer. Midl. Nat. 4: 222. 1915. Based on *Poa interior* Rydb.
- Poa nemoralis* var. *interior* Butters and Abbe, Rhodora 49: 6. 1947. Based on *P. interior* Rydb.
- (52) *Poa involuta* Hitchc., Biol. Soc. Wash. Proc. 41: 159. 1928. Chisos Mountains, Brewster County, Tex., *Ferris and Duncan* 2811.
- (68) *Poa juncifolia* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 11: 52. pl. 8. 1898. Point of Rocks, Sweetwater County, Wyo., *Nelson* 3721.
- Poa brachyglossa* Piper, Biol. Soc. Wash. Proc. 18: 145. 1905. Douglas County, Wash., *Sandberg and Leiberg* 267.
- Poa fendleriana* var. *juncifolia* Jones, West. Bot. Contrib. 14: 14. 1912. Based on *P. juncifolia* Scribn.
- (16) *Poa kelloggii* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 132: pl. 79. 1893. [Mendocino County], Calif., *Bolander* 4705.
- Poa bolanderi* var. *kelloggii* Jones, West. Bot. Contrib. 14: 15. 1912. Based on *P. kelloggii* Vasey.
- (26) *Poa languida* Hitchc., Biol. Soc. Wash. Proc. 41: 158. 1928. Based on *P. debilis* Torr.
- Poa debilis* Torr., Fl. N. Y. 2: 459. 1843. Not *P. debilis* Thuill., 1799. [Gorham], New York.
- (17) *Poa laxiflora* Buckl., Acad. Nat. Sci., Phila. Proc. 1862. 96. 1862. Columbia Woods, Oreg., *Nuttall*.
- Poa leptocoma elatior* Scribn. and Merr., U. S. Natl. Herb. Contrib. 13: 71. 1910. Cape Fox, Alaska, *Trelease and Saunders* 2982.
- Poa remissa* Hitchc., Biol. Soc. Wash. Proc. 41: 158. 1928. Sol Duc Hot Springs, Olympic Mountains, Wash., *Hitchcock* 23468.
- (61) *Poa leibergii* Scribn., U. S. Dept. Agr.,

- Div. Agrost. Bul. 8: 6. pl. 2. 1897. Owyhee-Malheur Divide, Oreg., *Leiberg* 2171.
- Poa hansenii* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 11: 53. pl. 9. 1898. Silver Lake, Amador County, Calif., *Hansen* 605.
- Poa pringlei* var. *hansenii* Smiley, Calif. Univ. Pubs., Bot. 9: 104. 1921. Based on *P. hansenii* Scribn.
- (34) *Poa leptocoma* Trin., Acad. St. Pétersb. Mém. VI. Math. Phys. Nat. 1: 374. 1830. Sitka, Alaska, *Mertens*.
- Poa stenantha* var. *leptocoma* Griseb. in Ledeb., Fl. Ross. 4: 373. 1853. Based on *P. leptocoma* Trin.
- Poa crandallii* Gandog., Soc. Bot. France Bul. 66: 301. 1920. Mountains of Larimer, Colo., *Crandall* in 1898.
- (59) *Poa lettermani* Vasey, U. S. Natl. Herb. Contrib. 1: 273. 1893. Grays Peak, Colo., *Letterman* 7.
- Poa brandegei* Scribn. in Beal, Grasses N. Amer. 2: 544. 1896. Grays Peak, Colo. *Jones* 714.
- Atropis lettermani* Beal, Grasses N. Amer. 2: 579. 1896. Based on *Poa lettermani* Vasey.
- (43) *Poa longiligula* Scribn. and Williams, U. S. Dept. Agr., Div. Agrost. Cir. 9: 3. 1899. Silver Reef, Utah, *Jones* 5149.
- Poa montana* Vasey, U. S. Dept. Agr., Monthly Rpt. 155. 1874. Not *P. montana* All., 1785. Nevada, *Watson* 1312.
- Poa longiligula* var. *wyomingensis* Williams, U. S. Dept. Agr., Div. Agrost. Cir. 10: 3. 1899. Tipton, Wyo., *Nelson* 4799a.
- Panicum longiligulum* Lunell, Amer. Midl. Nat. 4: 222. 1915. Based on *Poa longiligula* Scribn. and Williams.
- Poa fendleriana* var. *longiligula* Gould, Madroño 10: 94. 1949. Based on *P. longiligula* Scribn. and Williams.
- This species was referred to *Poa alpina* L. by Watson, in King, Geol. Expl. 40th Par. 5: 386. 1871.
- (8) *Poa macrantha* Vasey, Torrey Bot. Club Bul. 15: 11. 1888. Mouth of Columbia River, Oreg., *Howell* [in 1887].
- Melica macrantha* Beal, Torrey Bot. Club Bul. 17: 153. 1890. Based on *Poa macrantha* Vasey.
- (38) *Poa macroclada* Rydb., Torrey Bot. Club Bul. 32: 604. 1905. Rogers, Gunnison Watershed, Colo., *Baker* 802.
- (24) *Poa marcida* Hitchc., Biol. Soc. Wash. Proc. 41: 158. 1928. Sol Duc Hot Springs, Olympic Mountains, Wash., *Hitchcock* 23466.
- (60) *Poa montevansi* Kelso, Biol. Leaflets 29: 2. 1945. Mount Evans, Colo., *L.* and *E. H. Kelso* 427.
- (54) *Poa napensis* Beetle, West Bot. Leaflets 4: 289. 1946. Napa County, Calif., *Beetle* 4256.
- (37) *Poa nemoralis* L., Sp. Pl. 69. 1753. Europe.
- Panicum nemorale* Lunell, Amer. Midl. Nat. 4: 222. 1915. Based on *Poa nemoralis* L.
- (15) *Poa nervosa* (Hook.) Vasey, U. S. Dept. Agr., Div. Bot. Bul. 13: pl. 81. 1893. Based on *Festuca nervosa* Hook.
- Festuca nervosa* Hook., Fl. Bor. Amer. 2: 251. pl. 232. 1840. Nootka Sound, Vancouver Island, *Scouler*.
- Poa columbiensis* Steud., Syn. Pl. Glum. 1: 261. 1854. Columbia River, *Douglas*.
- Poa wheeleri* Vasey in Rothr., Cat. Pl. Survey W. 100th Merid. 55. 1874. South Park, Colo. [*Wolf*] 1131 [1131a].
- Poa pulchella* var. *major* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 13: pl. 82. 1893. Southern Oregon, no specimen cited, and none so named by Vasey can be found.
- Poa vaseyana* Scribn. in Beal, Grasses N. Amer. 2: 532. 1896. [Georgetown], Colo., *Patterson* in 1885.
- Poa cuspidata* Vasey ex Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 9: 6. 1899. Not *P. cuspidata* Nutt., 1818. As synonym of *P. wheeleri* Vasey.
- Poa olneyae* Piper, Erythra 7: 101. 1899. Spokane, Wash., *Piper* 2820.
- Poa subreflexa* Rydb., Torrey Bot. Club Bul. 36: 535. 1909. Steamboat Springs, Colo., *State Agricultural College* 3731.
- Poa wheeleri vaseyana* Will. and Pammel, Iowa Acad. Sci. Proc. 20: 144. 1915. Presumably based on *P. vaseyana* Scribn., "(Scribner.)" being cited.
- (66) *Poa nevadensis* Vasey ex Scribn., Torrey Bot. Club Bul. 10: 66. 1883. [Austin, Nev., *Jones* in 1882.]
- Atropis pauciflora* Thurb. in S. Wats., Bot. Calif. 2: 310. 1880. Not *Poa pauciflora* Roem. and Schult., 1817. Sierra Valley, Calif., *Lemmon* 1871. (Though credited to Lemmon the type specimen appears to have been collected by Bolander, Lemmon's name not appearing on the label.)
- Poa pauciflora* Benth. ex Vasey, Grasses U. S. 42. 1883. Not *P. pauciflora* Roem. and Schult., 1817. Based on *Atropis pauciflora* Thurb.
- Poa tenuifolia* var. *scabra* Vasey ex Scribn. Torrey Bot. Club Bul. 10: 66. 1883, as synonym of *P. nevadensis*. [California, *Lemmon*.]
- Panicularia thurberiana* Kuntze, Rev. Gen. Pl. 2: 783. 1891. Based on *Atropis pauciflora* Thurb.
- Poa thurberiana* Vasey, U. S. Dept. Agr., Div. Bot. Bul. 13: pl. 84. 1893. The name based on *Panicularia thurberiana* Kuntze, but the plant described and figured is *Melica imperfecta* Trin.
- Atropis nevadensis* Beal, Grasses N. Amer. 2: 577. 1896. Based on *Poa nevadensis* Vasey.

- (28) *Poa occidentalis* Vasey, U. S. Natl. Herb. Contrib. 1: 274. 1893. Las Vegas, N. Mex., *G. R. Vasey* in 1881. *Poa flexuosa* var. *occidentalis* Vasey in Rothr., in Wheeler, U. S. Survey W. 100th Merid. Rpt. 6: 290. 1878. Twin Lakes, Colo. [Wolf] 1132.
- Poa trivialis* var. *occidentalis* Vasey, Grasses U. S. Descr. Cat. 85. 1885. Colorado and New Mexico, the type being the specimen later described as *P. occidentalis* Vasey.
- Poa flexuosa* var. *robusta* Vasey, U. S. Natl. Herb. Contrib. 1: 271. 1893. Rocky Mountains, Colo., *Vasey* 673 [Powell's Expedition].
- Poa autumnalis* var. *robusta* Beal, Grasses N. Amer. 2: 534. 1896. Based on *P. flexuosa* var. *robusta* Vasey.
- Poa occidentalis* Rydb., N. Y. Bot. Gard. Mem. 1: 50. 1900. Based on *P. flexuosa* var. *occidentalis* Vasey.
- Poa platyphylla* Nash and Rydb., Torrey Bot. Club Bul. 28: 266. 1901. Based on *P. occidentalis* Vasey, the name changed because of *P. flexuosa* var. *occidentalis* Vasey, thought to be different.
- Poa lacustris* Heller, Muhlenbergia 6: 12. 1910. Based on *P. flexuosa* var. *occidentalis* Vasey.
- (35) *Poa paludigena* Fern. and Wieg., Rhodora 20: 126. 1918. Wayne County, N. Y., *Metcalf* and *Wiegand* 7572.
- Poa sylvestris* var. *palustris* Dudley, Cornell Univ. Bul. 2: 128. 1886. Michigan Hollow, N. Y.
- (39) *Poa palustris* L., Syst. Nat. ed. 10. 2: 874. 1759. Europe.
- Poa serotina* Ehrh., Beitr. Naturk. 6: 83. 1791, name only; Schrad. Fl. Germ. 1: 299. 1806. Europe.
- Poa triflora* Gilib., Exerc. Phyt. 2: 531. 1792. Europe.
- Poa crocata* Michx., Fl. Bor. Amer. 1: 68. 1803. Lake Mistassini, Quebec, *Michaux*. Misspelled *P. crocea* in Muhl., Cat. Pl. 11. 1813.
- Poa glauca* var. *crocata* Jones, West. Bot. Contrib. 14: 15. 1912. Based on *P. crocata* Michx.
- Paneion triflorum* Lunell, Amer. Midl. Nat. 4: 223. 1915. Based on *Poa triflora* Gilib.
- (50) *Poa pattersoni* Vasey, U. S. Natl. Herb. Contrib. 1: 275. 1893. Grays Peak, Colo., *Patterson* 154.
- (33) *Poa paucispicula* Scribn. and Merr., U. S. Natl. Herb. Contrib. 13: 69. pl. 15. 1910. Yakutat Bay, Alaska, *Coville* and *Kearney* 970.
- (18) *Poa pratensis* L., Sp. Pl. 67. 1753. Europe.
- Poa angustifolia* L. Sp. Pl. 67. 1753. Europe.
- Poa pratensis* var. *angustifolia* Gaudin, Agrost. Helv. 1: 214. 1811. Based on *P. angustifolia* L. This name has been credited to Smith, Fl. Brit. 105. 1800, but the combination is not there made, "*β. Poa angustifolia* L." merely cited under *P. pratensis*.
- ?*Poa viridis* Schreb. ex Pursh, Fl. Amer. Sept. 1: 79. 1814. North America. Name only, Muhl., Cat. Pl. 11. 1813.
- Poa angustifolia* Ell., Bot. S. C. and Ga. 1: 160. 1816. South Carolina.
- Paneion pratense* Lunell, Amer. Midl. Nat. 4: 222. 1915. Based on *Poa pratensis* L.
- Poa peckii* Chase, Wash. Acad. Sci. Jour. 28: 54. f. 2. 1938. Jefferson County, Oreg., *Peck* 19804.
- (58) *Poa pringlei* Scribn., Torrey Bot. Club Bul. 10: 31. 1883. Headwaters of the Sacramento River, Calif., *Pringle* [in 1882].
- Poa argentea* Howell, Torrey Bot. Club Bul. 15: 11. 1888. [Ashland Butte] Siskiyou Mountains, Oreg., *Howell* [in 1887].
- Melica argentea* Beal, Torrey Bot. Club Bul. 17: 153. 1890. Based on *Poa argentea* Howell.
- Melica nana* Beal, Grasses N. Amer. 2: 504. 1896. Based on *Poa argentea* Howell. Name changed because of "*M. argentea* Desv." [error for *M. argentata* Desv.].
- Atropis suksdorfii* Beal, Grasses N. Amer. 2: 574. 1896. [Mount Adams] Wash., *Suksdorf* 1116. Beal gives as synonym "*Poa suksdorfii* Vasey ined."
- Atropis pringlei* Beal, Grasses N. Amer. 2: 578. 1896. Based on *Poa pringlei* Scribn.
- Poa suksdorfii* Vasey ex Piper, U. S. Natl. Herb. Contrib. 11: 135. 1906. Based on *Atropis suksdorfii* Beal.
- (31) *Poa reflexa* Vasey and Scribn., U. S. Natl. Herb. Contrib. 1: 276. 1893. Kelso Mountain, near Torrey Peak, Colo., *Letterman* in 1885.
- Poa acuminata* Scribn. in Beal, Grasses N. Amer. 2: 538. 1896. [Mount Blackmore] Mont., *Tweedy* 639 in 1885, 1027 in 1886.
- Poa pudica* Rydb., Torrey Bot. Club Bul. 32: 603. 1905. Near Grays Peak, Colo., *Rydberg* 2443.
- Poa leptocoma* var. *reflexa* Jones, West. Bot. Contrib. 14: 15. 1912. Based on *P. reflexa* Vasey and Scribn.
- (11) *Poa rhizomata* Hitchc. in Jepson, Fl. Calif. 1: 155. 1912. Oro Fino, Siskiyou County, Calif., *Butler* 1205.
- ?*Poa piperi* Hitchc. in Abrams, Illustr. Fl. 1: 201. f. 461. 1923. Waldo, Oreg., *Piper* 6496.
- (51) *Poa rupicola* Nash, N. Y. Bot. Gard. Mem. 1: 49. 1900. Based on *P. rupestris* Vasey.
- Poa rupestris* Vasey, Torrey Bot. Club Bul. 14: 94. 1887. Not *P. rupestris*

- With., 1796. Rocky Mountains [Wolf 341 in 1873].
- (27) *Poa saltuensis* Fern. and Wieg., Rhodora 20: 122. 1918. Gaspé County Quebec, Fernald and Collins 357.
- Poa debilis* var. *acutiflora* Vasey ex Macoun, Cat. Can. Pl. 24: 225. 1888. Name only, for *Macoun* 28 and *Burgess* 12 and 13, Truro, Nova Scotia.
- Poa saltuensis* var. *microlepis* Fern. and Wieg., Rhodora 20: 124. 1918. Newfoundland, Fernald and Wiegand 4633.
- (62) *Poa scabrella* (Thurb.) Benth. ex Vasey, Grasses U. S. 42. 1883. Based on *Atropis scabrella* Thurb.
- Sclerochloa californica* Munro ex Benth., Pl. Hartw. 342. 1857. Name only, for *Hartweg* 2035, Sacramento Valley, Calif.
- Poa tenuifolia* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 96. 1862. Not *P. tenuifolia* A. Rich., 1851. Columbia River, Nuttall.
- Atropis scabrella* Thurb., in S. Wats., Bot. Calif. 2: 310. 1880. Oakland, Calif., Bolander.
- Atropis tenuifolia* Thurb. in S. Wats., Bot. Calif. 2: 310. 1880. Based on *Poa tenuifolia* Buckl.
- Poa orcuttiana* Vasey, West Amer. Sci. 3: 165. 1887. San Diego, Calif., *Orcutt* [1070] in 1884.
- Panicularia scabrella* Kuntze, Rev. Gen. Pl. 2: 783. 1891. Based on *Atropis scabrella* Thurb.
- Panicularia nuttalliana* Kuntze, Rev. Gen. Pl. 2: 783. 1891. Based on "*Atropis tenuifolia* Thurb., *Poa tenuifolia* Nutt., 1862" (error for Buckl.).
- Poa buckleyana* Nash, Torrey Bot. Club Bul. 22: 465. 1895. Based on *P. tenuifolia* Buckl.
- Poa capillaris* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 11: 51. f. 11. 1898. Not *P. capillaris* L., 1753. Potrero, Calif.
- Poa nudata* Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 9: 1. 1899. Based on *P. capillaris* Scribn.
- Poa acutiglumis* Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 9: 4. 1899. Grave Creek, Oreg., *Howell* in 1884.
- Poa limosa* Scribn. and Williams, U. S. Dept. Agr., Div. Agrost. Cir. 9: 5. 1899. Mono Lake, Calif., *Bolander*.
- (64) *Poa secunda* Presl, Rel. Haenk. 1: 271. 1830. Chile, *Haenke*.
- Poa sandbergii* Vasey, U. S. Natl. Herb. Contrib. 1: 276. 1893. Lewiston, Idaho, *Sandberg* 164.
- Poa incurva* Scribn. and Williams, U. S. Dept. Agr., Div. Agrost. Cir. 9: 6. 1899. Duckaloose Glacier, Olympic Mountains, Wash., *Piper* 1989.
- Poa buckleyana* var. *sandbergii* Jones, West. Bot. Contrib. 14: 14. 1912. Based on *P. sandbergii* Vasey.
- Paneion sandbergii* Lunell, Amer. Midl. Nat. 4: 223. 1915. Based on *Poa sandbergii* Vasey.
- (46) *Poa stenantha* Trin., Acad. St. Pétersb. Mém. VI. Math. Phys. Nat. 1: 376. 1830. Kamchatka, Unalaska, Sitka, Karaghinski Island.
- (30) *Poa sylvestris* A. Gray, Man. 596. 1848. Ohio and Kentucky, *Short*, *Sulivant*, Michigan and southwestward [type from Ohio, *Short* in 1842].
- (29) *Poa tracyi* Vasey, Torrey Bot. Club Bul. 15: 49. 1888. Raton, N. Mex., *Tracy* in 1887.
- Poa nervosa* var. *tracyi* Beal, Grasses N. Amer. 2: 538. 1896. Based on *P. tracyi* Vasey.
- (23) *Poa trivialis* L., Sp. Pl. 67. 1753. Europe.
- Poa stolonifera* Hall. ex Muhl., Descr. Gram. 139. 1817. Pennsylvania.
- Poa trivialis* var. *filiculmis* Scribn. in Beal, Grasses N. Amer. 2: 532. 1896. Vancouver Island, *Macoun* 282.
- Poa callida* Rydb., Torrey Bot. Club Bul. 36: 533. 1909. Helena, Mont., *Rydberg* 2145.
- (55) *Poa unilateralis* Scribn. in Vasey, U. S. Dept. Agr., Div. Bot. Bul. 13²: pl. 85. 1893. San Francisco, Calif. [*Jones* 15 in 1882].
- Atropis unilateralis* Beal, Grasses N. Amer. 2: 581. 1896. Based on *Poa unilateralis* Scribn.
- Poa pachypholis* Piper, Biol. Soc. Wash. Proc. 18: 146. 1905. Ilwaco, Wash., *Piper* [4900].
- (57) *Poa vaseyochloa* Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 9: 1. 1899. Based on *P. pulchella* Vasey.
- Poa pulchella* Vasey, Bot. Gaz. 7: 32. 1882. Not *P. pulchella* Salisb., 1796. Columbia River [mountains, Klickitat County, Wash.], *Suksdorf* [in 1881].
- Atropis pulchella* Beal, Grasses N. Amer. 2: 574. 1896. Based on *Poa pulchella* Vasey.
- Poa gracillima* var. *vaseyochloa* Jones, West. Bot. Contrib. 14: 14. 1912. Based on *P. vaseyochloa* Scribn.
- (32) *Poa wolfii* Scribn., Torrey Bot. Club Bul. 21: 228. 1894. [Canton], Ill., *Wolf* [in 1882].
- Poa alsodes* var. *wolfii* Vasey ex Scribn., Torrey Bot. Club Bul. 21: 228. 1894, as synonym of *P. wolfii* Scribn.

(77) POLYPOGON Desf.

- (4) *Polypogon australis* Brongn. in Duperrey, Bot. Voy. Coquille 2²: 21. 1830. Concepción, Chile.
- Polypogon crinitus* Trin., Gram. Unifl. 171. 1824. Not *P. crinitus* Nutt., 1818. Chile, *Chamisso*.
- Polypogon interruptus* var. *crinitus* Hack. in Stuck., An. Mus. Nac. Buenos Aires

- 13: 473. 1906. Based on *P. crinitus* Trin.
- (5) **Polypogon elongatus** H. B. K., Nov. Gen. et Sp. 1: 134. 1815. Chillo, Ecuador, *Humboldt and Bonpland*.
- (3) **Polypogon interruptus** H. B. K., Nov. Gen. et Sp. 1: 134. pl. 44. 1815. Venezuela, *Humboldt and Bonpland*.
Alopecurus interruptus Poir. in Lam., Encycl. Sup. 5: 495. 1817. Based on *Polypogon interruptus* H. B. K.
Polypogon lutosus (Poir.) Hitchc., misapplied to *P. interruptus*, appears to be a rare hybrid of southern Europe; not known from America.
- (2) **Polypogon maritimus** Willd., Gesell. Naturf. Freund. Berlin (n.s.) 3: 443. 1801. France.
Alopecurus maritimus Poir. in Lam., Encycl. 8: 779. 1808. Based on *Polypogon maritimus* Willd.
Polypogon monspeliensis var. *maritimus* Coss. and Dur., Expl. Sci. Alger. 2: 70. 1854. Based on *P. maritimus* Willd.
- (1) **Polypogon monspeliensis** (L.) Desf., Fl. Atlant. 1: 67. 1798. Based on *Alopecurus monspeliensis* L.
Alopecurus monspeliensis L., Sp. Pl. 61. 1753. Europe.
Phleum crinitum Schreb., Besch. Gräs. 1: 151. 1769. Based on *Alopecurus monspeliensis* L.
Alopecurus aristatus var. *monspeliensis* Huds., Fl. Angl. 28. 1778. Based on *A. monspeliensis* L.
Agrostis alopecuroides Lam., Tabl. Encycl. 1: 160. 1791. Based on *Alopecurus monspeliensis* L.
Phleum monspeliense Koel., Descr. Gram. 57. 1802. Based on *Alopecurus monspeliensis* L.
Polypogon crinitus Nutt., Gen. Pl. 1: 50. 1818. Based on *Phleum crinitum* Smith (error for Schreb.).
Polypogon flavescens Presl, Rel. Haenk. 1: 234. 1830. Peru, *Haenke*.
Santia monspeliensis Parl., Fl. Palerm. 1: 73. 1845. Based on *Alopecurus monspeliensis* L.

PSEUDOSASA Makino

- Pseudosasa japonica** (Sieb. and Zucc.) Makino, Jour. Jap. Bot. 2(4): 15. 1920. Based on *Arundinaria japonica* Sieb. and Zucc.
Arundinaria japonica Sieb. and Zucc. ex Steud., Syn. Pl. Glum. 1: 334. 1854. Japan; Java erroneously cited as locality.

(6) PUCCINELLIA Parl.

- (8) **Puccinellia airoides** (Nutt.) Wats. and Coult. in A. Gray, Man. ed. 6. 668. 1890. Based on *Poa airoides* Nutt.
Poa airoides Nutt., Gen. Pl. 1: 68. 1818.

- Not *P. airoides* Koel., 1802. Mandan, N. Dak., *Nuttall*.
Poa nuttalliana Schult., Mantissa 2: 303. 1824. Based on *P. airoides* Nutt.
Festuca nuttalliana Kunth, Rév. Gram. 1: 129. 1829. Based on *Poa nuttalliana* Schult.
Glyceria airoides Fries, Nov. Fl. Suec. Mant. 3: Add. 176. 1843. Not *G. airoides* Reichenb., 1829. Based on *Poa airoides* Nutt.
Glyceria montana Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 96. 1862. Rocky Mountains, *Nuttall*.
Panicularia distans airoides Scribn., Torrey Bot. Club Mem. 5: 54. 1894. Based on *Poa airoides* Nutt.
Atropis airoides Holm, Bot. Gaz. 46: 427. 1908. Based on *Poa airoides* Nutt.
Puccinellia cusickii Weatherby, Rhodora 18: 182. 1916. Grande Ronde Valley, Oreg., *Cusick* 3271.
Atropis nuttalliana Pilger, Notizbl. Bot. Gart. Berlin 9: 291. 1925. Based on *Poa nuttalliana* Schult.
- Wyoming specimens cited by Fernald and Weatherby (Rhodora 18: 16. 1916) under *Puccinellia lucida* (the type from Quebec) are here referred to *P. airoides*.
- (7) **Puccinellia distans** (L.) Parl., Fl. Ital. 367. 1848. Based on *Poa distans* L.
Poa distans L., Mant. Pl. 1: 32. 1767. Europe.
Aira aquatica var. *distans* Huds., Fl. Angl. 34. 1778. Based on *Poa distans* L.
Hydrochloa distans Hartm., Gen. Gram. Skand. 8. 1819. Presumably based on *Poa distans* L.
Glyceria distans Wahl., Fl. Upsal. 36. 1820. Based on *Poa distans* L.
Festuca distans Kunth, Rév. Gram. 1: 129. 1829. Based on *Poa distans* L.
Sclerachloa distans Bab., Man. Brit. Bot. 370. 1843. Based on *Poa distans* L.
Catabrosa distans Link ex Heynh., Nom. 2: 126. 1846. Based on *Glyceria distans* Wahl.
Atropis distans Griseb. in Ledeb., Fl. Ross. 4: 388. 1853. Based on *Poa distans* L.
Glyceria distans var. *tenuis* Uechtr. in Crép., Notes Pl. Rar. Belg. 229. 1865. Germany.
Sclerachloa multiculmis subsp. *distans* Syme in Sowerby, English, Bot. ed. 3. 11: 104. 1873. Based on *Poa distans* L.
Panicularia distans Kuntze, Rev. Gen. Pl. 2: 782. 1891. Based on *Poa distans* L.
Atropis distans var. *tenuis* Rouy, Fl. France 14: 195. 1913. Based on *Glyceria distans* var. *tenuis* Uechtr.
Puccinellia distans var. *tenuis* Fern. and Weath., Rhodora 18: 12. 1916. Based on *Glyceria distans* var. *tenuis* Uechtr.
Puccinellia suksdorfii St. John, Wash. State Col. Contrib. Dept. Bot. 2: 80. 1928. Rockland, Wash., *Suksdorf* 5089.

- (4) *Puccinellia fasciculata* (Torr.) Bicknell, Torrey Bot. Club Bul. 35: 197. 1908. Based on *Poa fasciculata* Torr.
Poa fasciculata Torr., Fl. North. and Mid. U. S. 1: 107. 1823. New York [Torrey].
Poa delawarica Link, Hort. Berol. 1: 174. 1827. Delaware.
Festuca delawarica Kunth, Rév. Gram. 1: 129. 1829. Based on *Poa delawarica* Link.
Festuca borrieri Bab., Linn. Soc. Trans. 17: 565. 1837. England.
Glyceria delawarica Heynh., Nom. 1: 360. 1840. Based on *Poa delawarica* Link.
Glyceria borrieri Bab. in Smith and Sowerby, English Bot. Sup. 3: pl. 2797. 1843. England.
Sclerochloa borrieri Bab., Man. Brit. Bot. 370. 1843. Based on *Glyceria borrieri* Bab.
Poa borrieri Parnell, Grasses Brit. 220. pl. 98. 1845. Based on *Sclerochloa borrieri* Bab.
Sclerochloa arenaria var. *fasciculata* A. Gray, Man. 594. 1848. Based on *Poa fasciculata* Torr.
Sclerochloa multiculmis subsp. *borrieri* Syme in Sowerby, English Bot. ed. 3. 11: 105. 1873. Based on *S. borrieri* Bab.
Atropis borrieri Richt., Pl. Eur. 1: 92. 1890. Based on *Glyceria borrieri* Bab.
Puccinellia borrieri Hitchc., Rhodora 10: 65. 1908. Based on *Festuca borrieri* Bab.
- (10) *Puccinellia grandis* Swallen, Wash. Acad. Sci. Jour. 34: 18. 1944. Seattle, Wash., Piper 1451. Has been confused with *P. nutkaensis* (Presl) Fern. and Weath., that not found in the United States. Has also been referred to *P. festucaeformis* Parl. of Europe.
- (5) *Puccinellia lemmoni* (Vasey) Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 17: 276. f. 572. 1899. Based on *Poa lemmoni* Vasey.
Poa lemmoni Vasey, Bot. Gaz. 3: 13. 1878. Sierra County, Calif., Lemmon.
Glyceria lemmoni Vasey, Grasses U. S. Descr. Cat. 88. 1885, name only; Torrey Bot. Club Bul. 13: 119. 1886. Based on *Poa lemmoni* Vasey.
Atropis lemmoni Vasey, U. S. Dept. Agr., Div. Bot. Bul. 13²: pl. 90. 1893. Based on *Poa lemmoni* Vasey.
Puccinellia rubida Elmer, Bot. Gaz. 36: 56. 1903. Prineville, Oreg., Cusick 2621.
- (6) *Puccinellia maritima* (Huds.) Parl., Fl. Ital. 1: 370. 1848. Based on *Poa maritima* Huds.
Poa maritima Huds., Fl. Angl. 35. 1762. England.
Poa maritima Muhl., Descr. Gram. 148. 1817. New England.
Glyceria maritima Wahlb., Fl. Gothob. 17. 1820. Based on *Poa maritima* Huds.
Festuca distans var. *maritima* Mutel., Fl. Franç. 4: 116. 1837. Based on *Poa maritima* Huds.
Poa maritima Bigel., Fl. Bost. ed. 3. 36. 1840. Cambridge and Dorchester, Mass.
Diachroa maritima Nutt. ex Steud., Nom. Bot. ed. 2. 1: 497. 1840, as synonym of *Glyceria maritima* Wahlb.
Sclerochloa maritima Lindl. in Bab., Man. Brit. Bot. 370. 1843. Based on *Glyceria maritima* Smith (same as Wahlb.).
Sclerochloa arenaria var. *maritima* A. Gray, Man. 594. 1848. Based on *Poa maritima* Huds.
Atropis maritima Griseb. in Ledeb., Fl. Ross. 4: 389. 1853. Based on *Poa maritima* Huds.
Atropis distans var. *maritima* Coss. and Dur., Expl. Sci. Alger. 2: 141. 1855. Based on *Poa maritima* Huds.
Panicularia maritima Scribn., Torrey Bot. Club Mem. 5: 54. 1894. Based on *Poa maritima* Huds.
- (1) *Puccinellia parishii* Hitchc., Biol. Soc. Wash. Proc. 41: 157. 1928. Rabbit Springs, Calif., Parish 9799.
- (9) *Puccinellia pumila* (Vasey) Hitchc., Amer. Jour. Bot. 21: 129. 1934. Based on *Glyceria pumila* Vasey.
Glyceria pumila Vasey, Torrey Bot. Club Bul. 15: 48. 1888. Vancouver Island, Macoun [in 1887].
Puccinellia maritima var. *minor* S. Wats. in A. Gray, Man. ed. 6. 668. 1890. Mount Desert, Maine, Rand.
- This is the species referred by American authors to *Atropis angustata* Griseb., *Glyceria angustata* Vasey, and *Puccinellia angustata* Nash. The names are based on *Poa angustata* R. Br., a species of Arctic America.
- (3) *Puccinellia rupestris* (With.) Fern. and Weath., Rhodora 18: 10. f. 17-22. 1916. Based on *Poa rupestris* With.
Poa rupestris With., Bot. Arr. Veg. Brit. ed. 3. 2: 146. 1796. England.
Poa procumbens Curtis, Fl. Lond. 6: pl. 11. 1798. England.
Sclerochloa procumbens Beauv., Ess. Agrost. 98. 1812. Based on *Poa procumbens* Curtis.
Festuca procumbens Kunth, Rév. Gram. 1: 129. 1829. Not *F. procumbens* Muhl., 1817. Based on *Poa procumbens* Curtis.
Scleropoa procumbens Parl., Fl. Ital. 1: 474. 1848. Based on *Poa procumbens* Curtis.
Atropis procumbens Thurb. in S. Wats., Bot. Calif. 2: 309. 1880. Based on *Poa procumbens* Curtis. [The specimen mentioned by Thurber (*Bolander* 6467) is *Poa unilateralis* Scribn., with a fragment of *Puccinellia rupestris*, which is not known to occur in California.]
Panicularia procumbens Kuntze, Rev. Gen. Pl. 2: 782. 1891. Based on *Poa procumbens* Curtis.
- (2) *Puccinellia simplex* Scribn., U. S. Dept.

Agr., Div. Agrost. Cir. 16: 1. f. 1. 1899.
Woodland, Calif., *Blankinship*.

(19) REDFIELDIA Vasey

- (1) *Redfieldia flexuosa* (Thurb.) Vasey, Torrey Bot. Club Bul. 14: 133. pl. 70. 1887. Based on *Graphephorum flexuosum* Thurb.

Graphephorum flexuosum Thurb. in A. Gray, Acad. Nat. Sci. Phila. Proc. 1863: 78. 1863. "Colorado Territory," latitude 41° [probably Nebraska], *Hall* and *Harbour* 635.

(135) REIMAROCHLOA Hitchc.

- (1) *Reimarochloa oligostachya* (Munro) Hitchc., U. S. Natl. Herb. Contrib. 12: 199. 1909. Based on *Reimaria oligostachya* Munro.

Reimaria oligostachya Munro ex Benth., Linn. Soc. Jour., Bot. 19: 34. 1881. [Jacksonville], Fla., *Curtiss* 3566.

(142) RHYNCHELYTRUM Nees

- (1) *Rhynchelytrum roseum* (Nees) Stapf and Hubb. ex Bews, World's Grass. 223. 1929, no basis cited; in Prain, Fl. Trop. Afr. 9: 880. 1930. Based on *Tricholaena rosea* Nees. Has been confused with *R. repens* (Willd.) C. E. Hubb., a pale-flowered annual from West Africa.

Tricholaena rosea Nees, "Cat. Sem. Hort. Vratisl. a. 1836"; Fl. Afr. Austr. 17. 1841. South Africa, *Drège*.

Panicum roseum Steud., Syn. Pl. Glum. 1: 92. 1854. Not *P. roseum* Willd., 1825. Based on *Tricholaena rosea* Nees.

Panicum teneriffae var. *rosea* F. M. Bailey, Queensl. Grass. 22. 1888. Based on *Tricholaena rosea* Nees.

Melinis rosea Hack., Oesterr. Bot. Ztschr. 51: 464. 1901. Based on *Tricholaena rosea* Nees.

Tricholaena repens var. *rosea* Alberts, Imp. Bur. Pastures and Forage Crops Bul. 37: 10. 1947. Presumably based on *Tricholaena rosea* Nees.

(162) ROTTBOELLIA L. f.

- (1) *Rottboellia exaltata* L. f., Nov. Gram. Gen. 40. pl. 1. 1779; Sup. Pl. 114. 1781. India.

Manisuris exaltata Kuntze, Rev. Gen. Pl. 2: 779. 1891. Based on *Rottboellia exaltata* L. f.

Stegosia exaltata Nash, N. Amer. Fl. 17: 84. 1909. Based on *Rottboellia exaltata* L. f.

(150) SACCHARUM L.

Saccharum bengalense Retz., Obs. Bot. 5: 16. 1789. India.

Saccharum ciliare Anderss., Öfv. Svensk. Vet. Akad. Förh. 12: 155. 1855. India.

- (1) *Saccharum officinarum* L., Sp. Pl. 54. 1753. India.

(139) SACCIOLEPIS Nash

Sacciolepis indica (L.) Chase, Biol. Soc. Wash. Proc. 21: 8. 1908. Based on *Aira indica* L.

Aira spicata L., Sp. Pl. 63. 1753. India.

Aira indica L., Sp. Pl. in Errata. 1753.

Based on *Aira spicata* L., page 63, the name changed because of *Aira spicata*, page 64, of the same work, the latter the basis of *Trisetum spicatum*.

Panicum indicum L., Mant. Pl. 2: 184. 1771. Not *P. indicum* Mill., 1768.

Based on *Aira indica* L.

Hymenachne indica Buse, in Miquel, Pl. Jungh. 377. 1854. Based on *Panicum indicum* L.

Sacciolepis spicata Honda, Tokyo Univ. Faculty. Sci. Jour. sec. 3. Bot. 3: 261. 1930. Based on *Aira spicata* L.

Panicum spicatum Farwell, Rhodora 32: 262. 1930. Not *P. spicatum* Roxb., 1820. Based on *Aira spicata* L.

- (1) *Sacciolepis striata* (L.) Nash, Torrey Bot. Club Bul. 30: 383. 1903. Based on *Holcus striatus* L.

Holcus striatus L., Sp. Pl. 1048. 1753. Virginia [Clayton 590].

Panicum striatum Lam., Tabl. Encycl. 1: 172. 1791. Carolina, *Fraser*.

Sorghum striatum Beauv., Ess. Agrost. 132, 165. 1812. Based on *Holcus striatus* L.

Panicum gibbum Ell., Bot. S. C. and Ga. 1: 116. 1816. Presumably South Carolina.

Panicum aquaticum Muhl., Descr. Gram. 126. 1817. Not *P. aquaticum* Poir., 1816. No locality cited.

Panicum fluitans Brickell ex Muhl., Descr. Gram. 126. 1817, as synonym of *P. aquaticum* Muhl.

Panicum hydrophilum Schult., Mantissa 2: 237. 1824. Based on *P. aquaticum* Muhl.

Panicum elliottianum Schult., Mantissa 2: 256. 1824. Based on *P. gibbum* Ell.

Panicum aquaticum Bosc ex Spreng., Syst. Veg. 1: 319. 1825. Not *P. aquaticum* Poir., 1816. Bermuda.

Hymenachne striata Griseb., Fl. Brit. W. Ind. 554. 1864. Based on *Panicum striatum* Lam.

Sacciolepis gibba Nash in Britton, Man. 89. 1901. Based on *Panicum gibbum* Ell. In a second printing of Britton, Man. 1902 (p. 89), the generic name is spelled *Saccollepis*.

Sacciolepis striata forma *gibba* Fernald, Rhodora 44, 381. 1942. Based on *Panicum gibbum* Ell.

(105) SCHEDONNARDUS Steud.

- (1) *Schedonnardus paniculatus* (Nutt.)

- Trel., in Branner and Coville, Rpt. Geol. Survey Ark. 1888⁴: 236. 1891. Based on *Lepturus paniculatus* Nutt.
Lepturus paniculatus Nutt., Gen. Pl. 1: 81. 1818. Mandan, N. Dak.
Rottboellia paniculata Spreng., Syst. Veg. 1: 300. 1825. Based on *Lepturus paniculatus* Nutt.
Schedonnardus texanus Steud., Syn. Pl. Glum. 1: 146. 1854. Texas, Drummond 360.
Spirochloe paniculata Lunell, Amer. Midl. Nat. 4: 220. 1915. Based on *Lepturus paniculatus* Nutt.

(54) SCHISMUS Beauv.

- (2) *Schismus arabicus* Nees, Fl. Afr. Austr. 1: 422. 1841. Arabia.
Schismus barbatus subsp. *arabicus* Maire and Weiller, Soc. Hist. Nat. Afr. Nord. Bul. 30: 310. 1939. Based on *S. arabicus* Nees.
(1) *Schismus barbatus* (L.) Thell., Bul. Herb. Boiss. II. 7: 391. 1907 in obs. Based on *Festuca barbata* L.
Festuca barbata L., Amoen. Acad. 3: 400. 1756. Spain.
Schismus fasciculatus Beauv., Ess. Agrost. 74, 177. 1812, name only; Trin., Fund. Agrost. 148. 1820. No locality cited.
Schismus marginatus Beauv., Ess. Agrost. 177. pl. 15. f. 4. 1812. No locality cited.

(31) SCHIZACHNE Hack.

- (1) *Schizachne purpurascens* (Torr.) Swallen, Wash. Acad. Sci. Jour. 18: 204. f. 1. 1928. Based on *Trisetum purpurascens* Torr.
Avena striata Michx., Fl. Bor. Amer. 1: 73. 1803. Not *A. striata* Lam., 1783. Between Hudson Bay and Lake Mistassini, Michaux.
Trisetum purpurascens Torr., Fl. North. and Mid. U. S. 1: 127. 1823. Williamstown, Mass., Dewey; also Boston, Catskill Mountains, N. Y., and Montreal.
Avena callosa Turcz. in Ledeb., Fl. Ross. 4: 416. 1853. Siberia.
Avena striata forma *albicans* Fernald, Rhodora 7: 244. 1905. Mount Albert, Quebec, Collins and Fernald 26.
Melica striata Hitchc., Rhodora 8: 211. 1906. Based on *Avena striata* Michx.
Melica striata forma *albicans* Fernald, Rhodora 10: 47. 1908. Based on *Avena striata* forma *albicans* Fernald.
Melica purpurascens Hitchc., U. S. Natl. Herb. Contrib. 12: 156. 1908. Based on *Trisetum purpurascens* Torr.
Schizachne fauriei Hack., Repert. Sp. Nov. Fedde 7: 323. 1909. Sachalin Island, Faurie.
Avena torreyi Nash in Britt. and Brown, Illustr. Fl. ed. 2. 1: 219. 1913. Based on *Trisetum purpurascens* Torr., not

- Avena purpurascens* DC., 1813.
Bromelica striata Farwell, Rhodora 21: 77. 1919. Based on *Avena striata* Michx.
Schizachne striata Hultén, Svensk. Bot. Tidskr. 30: 518. 1936. Based on *Avena striata* Michx.
Schizachne purpurascens forma *albicans* Fernald, Rhodora 44: 139. 1942. Based on *Avena striata* forma *albicans* Fernald.
Schizachne callosa Ohwi, Act. Phytotax. and Geobot. 2: 279. 1933. Based on *Avena callosa* Turcz.

(8) SCLEROCHLOA Beauv.

- (1) *Sclerochloa dura* (L.) Beauv., Ess. Agrost. 98, 174, 177. pl. 19. f. 4. 1812. Based on *Poa dura* L. (error for Scop.).
Cynosurus durus L., Sp. Pl. 72. 1753. Southern Europe.
Poa dura Scop., Fl. Carn. ed. 2. 1: 70. 1772. Based on *Cynosurus durus* L.
Eleusine dura Lam., Tabl. Encycl. 1: 203. 1791. Based on *Cynosurus durus* L.
Crassipes annuus Swallen, Amer. Jour. Bot. 18: 684. f. 1-4. 1931. Between Salt Lake City and Ogden, foot of Wasatch Mountains, Utah, Fallas in 1928.

(5) SCLEROPOA Griseb.

- (1) *Scleropoa rigida* (L.) Griseb., Spic. Fl. Rum. 2: 431. 1844. Based on *Poa rigida* L.
Poa rigida L., Cent. Pl. 1: 5. 1755; Amoen. Acad. 4: 265. 1759. Europe.
Poa cristata Walt., Fl. Carol. 80. 1788. Not *P. cristata* L., 1767. South Carolina.
Sclerochloa rigida Link, Enum. Pl. 1: 90. 1821. Based on *Poa rigida* L.
Glyceria rigida J. E. Smith, English Fl. 1: 119. 1824. Based on *Poa rigida* L.
Festuca rigida Raspail, Ann. Sci. Nat., Bot. 5: 445. 1825. Based on *Poa rigida* L.
Synaphe rigida Dulac, Fl. Haut. Pyr. 90. 1867. Based on *Scleropoa rigida* Griseb.
Diplachne rigida Munro ex Chapm., Fl. South. U. S. ed. 3. 609. 1897. Based on *Poa rigida* L.

(41) SCLEROPOGON Phil.

- (1) *Scleropogon brevifolius* Phil., An. Univ. Chile 36: 206. 1870. Mendoza, Argentina.
Festuca macrostachya Torr. and Gray, U. S. Rpt. Expl. Miss. Pacif. 2⁴: 177. 1855. Name only. Pecos, Tex. [Staminate specimen.]
Tricuspis monstra Munro ex Hemsl., Diag. Pl. Mex. 56. 1880, as synonym of *Scleropogon brevifolius* Phil.

- Lesourdia karwinskyana* Fourn., Soc. Bot. France Bul. 27: 102. pl. 4. f. 12. 1880. Mexico, *Karwinsky* 992.
Lesourdia multiflora Fourn., Soc. Bot. France Bul. 27: 102. pl. 3, 4. 1880. Tampico, Mexico, *Bernier*.
Scleropogon karwinskyanus Benth. ex S. Wats., Amer. Acad. Sci. Proc. 18: 181. 1883. Based on *Lesourdia karwinskyana* Fourn.

(9) **SCOLOCHLOA** Link

- (1) *Scolochloa festucacea* (Willd.) Link, Hort. Berol. 1: 137. 1827. Based on *Arundo festucacea* Willd.
Festuca arundinacea Liljebl., Utk. Svensk Fl. ed. 2. 47. 1798. Not *F. arundinacea* Schreb., 1771. Sweden.
Arundo festucacea Willd., Enum. Pl. 1: 126. 1809. Germany.
Triodia festucacea Roth, Enum. Pl. Phaen. Germ. 1: 382. 1827. Based on *Arundo festucacea* Willd.
Graphephorum festucaceum A. Gray, Amer. Acad. Sci. Proc. 5: 191. 1861. Based on *Arundo festucacea* Willd.
Scolochloa arundinacea MacM., Met. Minn. Vall. 79. 1892. Not *S. arundinacea* Mert. and Koch, 1823. Based on *Festuca arundinacea* Liljebl.
Fluminea festucacea Hitchc., U. S. Dept. Agr. Bul. 772: 38. f. 11. 1920. Based on *Arundo festucacea* Willd.

(53) **SCRIBNERIA** Hack.

- (1) *Scribneria bolanderi* (Thurb.) Hack., Bot. Gaz. 11: 105. pl. 5. 1886. Based on *Lepturus bolanderi* Thurb.
Lepturus bolanderi Thurb., Amer. Acad. Sci. Proc. 7: 401. 1868. Russian River Valley, Calif., *Bolander*.

(45) **SECALE** L.

- (1) *Secale cereale* L., Sp. Pl. 84. 1753. Europe.
Triticum cereale Salisb., Prodr. Stirp. 27. 1796. Based on *Secale cereale* L.
Secale montanum Guss., Fl. Sci. Prod. 1: 145. 1827.

(143) **SETARIA** Beauv.

- Setaria barbata* (Lam.) Kunth, Rév. Gram. 1: 47. 1829. Based on *Panicum barbata* Lam.
Panicum barbata Lam., Tabl. Encycl. 1: 171. 1791. Mauritius.
Panicum costatum Roxb., Fl. Ind. ed. Carey 1: 314. 1820. Mauritius.
Panicum viaticum Salzm. ex Doell, in Mart., Fl. Bras. 2: 155. 1877. Bahia, Brazil, *Salzmann* 706.
Chamaeraphis viatica Kuntze, Rev. Gen. Pl. 2: 770. 1891. Based on *Panicum viaticum* Salzm.
Chamaeraphis costata Kuntze, Rev. Gen.

- Pl. 2: 771. 1891. Based on *Panicum costatum* Roxb.
Chaetochloa barbata Hitchc. and Chase, U. S. Natl. Herb. Contrib. 18: 348. 1917. Based on *Panicum barbata* Lam.
Setaria carnei Hitchc., Soc. Linn. N. S. W. Proc. 52: 185. 1927. Western Australia.
(8) *Setaria corrugata* (Ell.) Schult., Mantissa 2: 276. 1824. Based on *Panicum corrugatum* Ell.
Panicum corrugatum Ell., Bot. S. C. and Ga. 1: 113. 1816. Savannah, Ga., *Baldwin*.
Pennisetum corrugatum Nutt., Gen. Pl. 1: 55. 1818. Presumably based on *Panicum corrugatum* Ell.
Setaria glauca var. *corrugata* Schrad., Linnaea 12: 429. 1838. Based on *S. corrugata* Schult.
Chamaeraphis corrugata Kuntze, Rev. Gen. Pl. 2: 770. 1891. Based on *Panicum corrugatum* Ell.
Chaetochloa corrugata Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 4: 39. 1897. Based on *Panicum corrugatum* Ell.
Chaetochloa hispida Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 21: 25. f. 13. 1900. Cuba, *Wright*.
Setaria hispida Schum., Just's Bot. Jahresber. 28: 417. 1902. Based on *Chaetochloa hispida* Scribn. and Merr.
(13) *Setaria faberii* Herrm., Beitr. Biol. Pflanz. 10: 51. 1910. Prov. Szechwan, China "*(Faber 582-1182)*."
(2) *Setaria geniculata* (Lam.) Beauv., Ess. Agrost. 51, 169, 178. 1812. Based on *Panicum geniculatum* Lam.
Panicum geniculatum Lam., Encycl. 4: 727 (err. typ. 737). 1798. Guadeloupe.
Cenchrus parviflorus Poir. in Lam., Encycl. 6: 52. 1804. Puerto Rico.
Setaria gracilis H. B. K., Nov. Gen. et Sp. 1: 109. 1815. Colombia, *Humboldt* and *Bonpland*.
Setaria purpurascens H. B. K., Nov. Gen. et Sp. 1: 110. 1815. Ecuador, *Humboldt* and *Bonpland*.
Pennisetum geniculatum Jacq., Eclog. Gram. 3: pl. 26. 1815-1820. Based on *Panicum geniculatum* Lam.
Panicum imberbe Poir. in Lam., Encycl. Sup. 4: 272. 1816. North America and Brazil.
Panicum laevigatum Muhl. ex Ell., Bot. S. C. and Ga. 1: 112. 1816. Not *P. laevigatum* Lam. 1778. Eddings Island, S. C. (Published as new in Muhl., Descr. Gram. 100. 1817, for the same species.)
Panicum glaucum var. *purpurascens* Ell., Bot. S. C. and Ga. 1: 113. 1816. Parris Island and Charleston Neck, S. C.
Panicum medium Muhl. ex Ell., Bot. S. C. and Ga. 1: 113. 1816, as synonym of *P. glaucum* var. *purpurascens* Ell.
Setaria imberbis Roem. and Schult., Syst.

- Veg. 2: 891. 1817. Based on *Panicum imberbe* Poir.
- Pennisetum laevigatum* Nutt., Gen. Pl. 1: 55. 1818. Presumably based on *Panicum laevigatum* Muhl.
- Setaria laevigata* Schult., Mantissa 2: 275. 1824. Based on *Panicum laevigatum* Muhl.
- Setaria affinis* Schult., Mantissa 2: 276. 1824. Based on Muhlenberg's *Panicum* No. 4. Georgia and Pennsylvania.
- Setaria berteroniana* Schult., Mantissa 2: 276. 1824. Dominican Republic, Bertero.
- Setaria glauca* var. *purpurascens* Torr., Fl. North. and Mid. U. S. 153. 1824. Based on *Setaria purpurascens* H. B. K. Published as new by Urban (Symb. Antill. 4: 96. 1903), based on the same type.
- Panicum flavum* Nees, Agrost. Bras. 238. 1829. Brazil.
- Panicum dasyurum* Nees, Agrost. Bras. 241. 1829. Brazil, Hoffmansegg; Montevideo, Sellow.
- Panicum fuscescens* Willd. ex Nees, Agrost. Bras. 241. 1829, as synonym of *P. purpurascens* H. B. K. [South America, Humboldt].
- Panicum penicillatum* Willd. ex Nees, Agrost. Bras. 242. 1829. Not *P. penicillatum* Nees ex Trin. 1826. Brazil.
- Panicum tejucense* Nees, Agrost. Bras. 243. 1829. Tejuco, Brazil.
- Setaria flava* Kunth, Rév. Gram. 1: 46. 1829. Based on *Panicum flavum* Nees.
- Setaria ventenatii* Kunth, Rév. Gram. 1: 251. pl. 37. 1830. Puerto Rico.
- Setaria tejucensis* Kunth, Rév. Gram. 1: Sup. 11. 1830. Based on *Panicum tejucense* Nees.
- Setaria penicillata* Presl, Rel. Haenk. 1: 314. 1830. Based on *Panicum penicillatum* Willd.
- Panicum ventenatii* Steud., Nom. Bot. ed. 2: 2: 265. 1841. Based on *Setaria ventenatii* Kunth.
- Panicum berteronianum* Steud., Syn. Pl. Glum. 1: 50. 1854. Based on *Setaria berteroniana* Schult.
- Setaria glauca* var. *laevigata* Chapm., Fl. South. U. S. 578. 1860. Based on *Panicum laevigatum* Muhl.
- Setaria stipaeulmis* C. Muell., Bot. Ztg. 19: 323. 1861. Rio Brazos, Tex., Drummond.
- Setaria glauca* var. *penicillata* Griseb., Fl. Brit. W. Ind. 554. 1864. Based on *Panicum penicillatum* Willd.
- Setaria glauca* var. *imberbis* Griseb., Fl. Brit. W. Ind. 554. 1864. Based on *Panicum imberbe* Poir.
- Panicum imberbe* var. *dasyurum* Doell, in Mart., Fl. Bras. 2²: 157. 1877. Based on *P. dasyurum* Nees.
- Panicum imberbe* var. *purpurascens* Doell, in Mart., Fl. Bras. 2²: 157. 1877. Based on *P. purpurascens* H. B. K.
- Setaria streptobotrys* Fourn., Mex. Pl. 2: 47. 1886. Mexico, Galeotti 5832, Liebmenn 358, and several other collections cited.
- Chamaeraphis glauca* var. *imberbis* Kuntze, Rev. Gen. Pl. 2: 767. 1891. Based on *Panicum imberbe* Poir.
- Chamaeraphis glauca* var. *penicillata* Kuntze, Rev. Gen. Pl. 2: 767. 1891. Based on *Panicum penicillatum* Willd.
- Chamaeraphis glauca* var. *geniculata* Kuntze, Rev. Gen. Pl. 2: 767. 1891. Based on *Panicum geniculatum* Lam.
- Setaria perennis* Hall ex Smyth, Check List Pl. Kans. 26. 1892. [Hutchinson] Kans., Smyth.
- Setaria gracilis* var. *dasyura* Arech., An. Mus. Nac. Montevideo 1: 165. 1894. Based on *Panicum dasyurum* Nees.
- Chamaeraphis ventenatii* Beal, Grasses N. Amer. 2: 153. 1896. Based on *Setaria ventenatii* Kunth.
- Chamaeraphis glauca* var. *laevigata* Beal, Grasses N. Amer. 2: 155. 1896. Based on *Panicum laevigatum* Muhl.
- Chamaeraphis glauca* var. *perennis* Beal, Grasses N. Amer. 2: 156. 1896. Florida, Curtiss 3614.*
- Chaetochloa imberbis* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 4: 39. 1897. Based on *Panicum imberbe* Poir.
- Chaetochloa penicillata* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 4: 39. 1897. Based on *Panicum penicillatum* Willd.
- Chaetochloa flava* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 4: 39. 1897. Based on *Panicum flavum* Nees.
- Chaetochloa versicolor* Bicknell, Torrey Bot. Club Bul. 25: 105. pl. 329. 1898. New York City, Bicknell.
- Chaetochloa perennis* Bicknell, Torrey Bot. Club Bul. 25: 107. 1898. Based on *C. glauca* var. *perennis* Beal.
- Chaetochloa laevigata* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 21: 10. 1900. Based on *Panicum laevigatum* Muhl.
- Chaetochloa imberbis penicillata* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 21: 11. f. 2. 1900. Based on *Panicum penicillatum* Willd.
- Chaetochloa imberbis perennis* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 21: 12. 1900. Based on *Setaria perennis* Hall.
- Chaetochloa imberbis geniculata* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 21: 12. 1900. Based on *Panicum geniculatum* Lam.
- Chaetochloa imberbis streptobotrys* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 21: 13. 1900. Based on *Setaria streptobotrys* Fourn.
- Chaetochloa purpurascens* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 21: 13. 1900. Based on *Setaria purpurascens* H. B. K.

- Chaetochloa gracilis* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 21: 15. 1900. Based on *Setaria gracilis* H. B. K.
- Chaetochloa corrugata parviflora* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 21: 24. 1900. Based on *Cenchrus parviflorus* Poir.
- Ixophorus glaucus-laevigata* Chapm. ex Gattinger, Tenn. Fl. 38. 1901. Presumably based on *Setaria glauca* var. *laevigata* Chapm.
- Panicum glaberrimum* Ell. ex. Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 29: 3. 1901. Not *P. glaberrimum* Steud., 1854. As synonym of *Chaetochloa imberbis* Scribn.
- Chaetochloa ventenatii* Nash in Kearney, U. S. Natl. Herb. Contrib. 5: 515. 1901. Based on *Setaria ventenatii* Kunth.
- Chaetochloa occidentalis* Nash in Britton, Man. 90. 1901. Kansas [type, Hutchinson, Smyth] and Oklahoma.
- Panicum imberbe* var. *gracile* Kneucker, Allg. Bot. Ztschr. 8: 13. 1902. Based on *Setaria gracilis* H. B. K.
- Setaria glauca* var. *geniculata* Urban, Symb. Antill. 4: 96. 1903. Based on *Panicum geniculatum* Lam.
- Setaria glauca* var. *purpurascens* Urban, Symb. Antill. 4: 96. 1903. Based on *S. purpurascens* H. B. K.
- Chaetochloa geniculata* Millsp. and Chase, Field Mus. Bot. 3: 37. 1903. Based on *Panicum geniculatum* Lam.
- Chamaeraphis imberbis* Kuntze ex Stuck., An. Mus. Nac. Buenos Aires 11: 76. 1904. Based on *Panicum imberbe* Poir.
- Chamaeraphis gracilis* Kuntze ex Stuck., An. Mus. Nac. Buenos Aires 11: 76. 1904. Not *C. gracilis* Hack., 1885. Based on *Setaria gracilis* H. B. K.
- Chamaeraphis penicillata* Presl. ex Stuck., An. Mus. Nac. Buenos Aires 11: 76. 1904. Based on *Setaria penicillata* Presl.
- Setaria imberbis* var. *perennis* Hitchc., Rhodora 8: 210. 1906. Based on *S. perennis* Hall.
- Setaria imberbis* var. *purpurascens* Hack. in Stuck., An. Mus. Nac. Buenos Aires 13: 442. 1906. Based on *S. purpurascens* H. B. K.
- Chaetochloa imberbis versicolor* Stone, N. J. Mus. Ann. Rpt. 1910: 213. 1911. Based on *C. versicolor* Bicknell.
- Panicum versicolor* Nieuwl., Amer. Midl. Nat. 2: 64. 1911. Not *P. versicolor* Doell, 1877. Based on *Chaetochloa versicolor* Bicknell.
- Panicum occidentale* Nieuwl., Amer. Midl. Nat. 2: 64. 1911. Not *P. occidentale* Scribn., 1899. Based on *Chaetochloa occidentalis* Nash.
- Chaetochloa geniculata* var. *perennis* House, N. Y. State Mus. Bul. 254: 85. 1924. Based on *Setaria perennis* Hall.
- Chaetochloa viridis* var. *purpurascens* Honda, Bot. Mag. Tokyo 38: 197. 1924. Based on *Setaria purpurascens* H. B. K.
- Panicum lutescens* var. *flavum* Backer, Handb. Fl. Java 2: 142. 1928. Based on *P. flavum* Nees.
- Chaetochloa geniculata* var. *purpurascens* Farwell, Mich. Acad. Sci. Papers 26: 5. 1941. Based on *Panicum glaucum* var. *purpurascens* Ell.
- (10) *Setaria grisebachii* Fourn., Mex. Pl. 2: 45. 1886. Orizaba, Mexico, [Schaffner 36].
- Setaria laevis* Fourn., Mex. Pl. 2: 45. 1886. Bernal, Mexico, Karwinsky 961.
- Chaetochloa grisebachii* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 4: 39. 1897. Based on *Setaria grisebachii* Fourn.
- Chaetochloa grisebachii* var. *ampla* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 21: 36. f. 21. 1900. Federal District, Mexico, Pringle 4670 [error for 6470].
- Chaetochloa grisebachii* var. *mexicana* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 21: 37. 1900. San Luis Potosí, Mexico, Schaffner 1044.
- Setaria mexicana* Schaffn. ex Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 21: 37. 1900, as synonym of *Chaetochloa grisebachii* var. *mexicana* Scribn. and Merr.
- (14) *Setaria italica* (L.) Beauv., Ess. Agrost. 51, 170, 178. 1812. Based on *Panicum italicum* L.
- Panicum italicum* L., Sp. Pl. 56. 1753. India.
- Panicum germanicum* Mill., Gard. Diet. ed. 8. *Panicum* No. 1. 1768. Europe.
- Panicum italicum* var. *germanicum* Koel., Descr. Gram. 17. 1802. Europe.
- Pennisetum italicum* R. Br., Prodr. Fl. Nov. Holl. 1: 195. 1810. Based on *Panicum italicum* L.
- Setaria germanica* Beauv., Ess. Agrost. 51, 169, 178. 1812. Based on *Panicum germanicum* Willd. (same as Mill. 1768).
- Pennisetum germanicum* Baumg., Enum. Stirp. Transsilv. 3: 277. 1816. Based on *Setaria germanica* Beauv.
- Setaria italica* var. *germanica* Schrad., Linnaea 12: 430. 1838. Based on *Panicum germanicum* Roth (same as Mill. 1768).
- Setaria californica* Kellogg, Calif. Acad. Sci. Proc. 1 (ed. 2): 26. 1873. Shasta, Calif., Dash.
- Panicum italicum* var. *californicum* Koern. and Wern., Handb. Getreidebau. 1: 272, 273. 1885. California.
- Chamaeraphis italica* Kuntze, Rev. Gen. Pl. 2: 767. 1891. Based on *Panicum italicum* L.
- Chamaeraphis italica* var. *germanica*

- Kuntze, Rev. Gen. Pl. 2: 768. 1891. Based on *Panicum germanicum* L. (error for Mill.).
- Ixophorus italicus* Nash, Torrey Bot. Club Bul. 22: 423. 1895. Based on *Panicum italicum* L.
- Chaetochloa italica* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 4: 39. 1897. Based on *Panicum italicum* L.
- Chaetochloa italica germanica* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 6: 32. 1897. Based on *Panicum germanicum* Mill.
- Chaetochloa germanica* Smyth, Kans. Acad. Trans. 25: 89. 1913. Based on *Panicum germanicum* Mill.
- Setaria italica* subsp. *stramineofructa* subvar. *germanica* Hubb., Amer. Jour. Bot. 2: 189. 1915. Based on *Panicum germanicum* Mill.
- Setaria italica* subsp. *stramineofructa* var. *brunneoseta* subvar. *densior* Hubb., Amer. Jour. Bot. 2: 192. 1915. Weston, Mass., Williams in 1895.
- (9) *Setaria liebmanni* Fourn., Mex. Pl. 2: 44. 1886. Mexico, Liebmann 389.
- Setaria rariflora* Presl, Rel. Haenk. 1: 313. 1830. Not *S. rariflora* Mikan, 1821. Acapulco, Mexico, Haenke.
- Panicum rariflorum* Presl ex Steud., Syn. Pl. Glum. 1: 51. 1854. Not *P. rariflorum* Lam., 1798. Based on *Setaria rariflora* Presl.
- Chamaeraphis caudata* var. *pauciflora* Vasey ex Beal, Grasses N. Amer. 2: 158. 1896. [Baja] California [type, Guaymas, Mexico], Palmer 191.
- Chaetochloa liebmanni* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 21: 31. 1900. Based on *Setaria liebmanni* Fourn.
- Chaetochloa liebmanni pauciflora* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 21: 33. 1900. Based on *Chamaeraphis caudata* var. *pauciflora* Vasey.
- (1) *Setaria lutescens* (Weigel) Hubb., Rhodora 18: 232. 1916. Based on *Panicum lutescens* Weigel.
- Panicum lutescens* Weigel, Obs. Bot. 20. 1772. Germany.
- Panicum glaucum* var. *elongatum* Pers., Syn. Pl. 1: 81. 1805. America.
- Panicum glaucum* var. *flavescens* Ell., Bot. S. C. and Ga. 1: 113. 1816. Presumably South Carolina.
- Panicum glaucum* var. *laevigatum* LeConte ex Torr., in Eaton, Man. Bot. ed. 2. 339. 1818. Northern and Middle States.
- Setaria glauca* var. *elongata* Raddi, Agrost. Bras. 49. 1823. Based on *Panicum glaucum* var. *elongatum* Pers.
- Panicum compressum* Balb. ex Steud., Nom. Bot. ed. 2. 2: 254. 1841, erroneously cited as synonym of *P. glaucum* R. Br. [Dominican Republic, Bertero.]
- Chaetochloa lutescens* Stuntz, U. S. Dept. Agr., Bur. Plant Indus. Inventory Seeds 31: 36, 86. 1914. Based on *Panicum lutescens* Weigel.
- Chaetochloa glauca* var. *purpurea* Farwell, Mich. Acad. Sci. Papers 26: 5. 1941. Detroit, Mich., Farwell 5661.
- Panicum glaucum* L. has been shown to apply to pearl millet (see *Pennisetum glaucum*, p. 727). The name at an early date came to be used for the species here called *Setaria lutescens*. The following names have been misapplied to this species:
- Panicum glaucum* L., Sp. Pl. 56. 1753.
- Setaria glauca* Beauv., Ess. Agrost. 51, 178. 1812.
- Chamaeraphis glauca* Kuntze, Rev. Gen. Pl. 2: 767. 1891.
- Ixophorus glaucus* Nash, Torrey Bot. Club Bul. 22: 423. 1895.
- Chaetochloa glauca* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 4: 39. 1897.
- (4) *Setaria macrosperma* (Scribn. and Merr.) Schum., Just's Bot. Jahresber. 28¹: 417. 1902. Based on *Chaetochloa macrosperma* Scribn. and Merr.
- Chaetochloa macrosperma* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 21: 33. f. 18. 1900. St. Johns River, Fla., Curtiss 3617.
- (6) *Setaria macrostachya* H. B. K., Nov. Gen. et Sp. 1: 110. 1815. [Guana-juato], Mexico, Humboldt and Bonpland.
- Panicum macrostachyum* Nees, Agrost. Bras. 245. 1829. Based on *Setaria macrostachya* H. B. K.
- Chamaeraphis setosa* var. *macrostachya* Kuntze, Rev. Gen. Pl. 2: 769. 1891. Based on *Setaria macrostachya* H. B. K.
- Chaetochloa gibbosa* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 21: 24. 1900. Mexico [probably Tamaulipas], Berlandier 528.
- Chaetochloa leucopila* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 21: 26, f. 14. 1900. Parras, Coahuila, Palmer 1363 in 1880.
- Chaetochloa macrostachya* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 21: 29, f. 16. 1900. Based on *Setaria macrostachya* H. B. K.
- Chaetochloa rigida* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 21: 30. 1900. La Paz, Baja California, Palmer 125 in 1890.
- Setaria leucopila* Schum. in Just's Bot. Jahresber. 28¹: 417. 1902. Based on *Chaetochloa leucopila* Scribn. and Merr.
- Setaria gibbosa* Schum. in Just's Bot. Jahresber. 28¹: 417. 1902. Based on *Chaetochloa gibbosa* Scribn. and Merr.
- Setaria rigida* Schum. in Just's Bot. Jahresber. 28¹: 417. 1902. Not *S. rigida* Stapf, 1899. Based on *Chaetochloa rigida* Scribn. and Merr.
- Chamaeraphis macrostachya* Kuntze ex

- Stuck., An. Mus. Nac. Buenos Aires 11: 76. 1904. Based on *Setaria macrostachya* H. B. K.
- Setaria commutata* Hack. ex Stuck., An. Hist. Nat. Buenos Aires 13: 439. 1906. Based on *Chaetochloa composita* as described and figured by Scribner and Merrill (U. S. Dept. Agr., Div. Agrost. Bul. 21: 27. f. 15. 1900), not *Setaria composita* H. B. K., on which the name *Chaetochloa composita* Scribn. is based. The name is published as "*Setaria commutata* (Scribn.) Hack."
- Setaria caudata* var. *pauciflora* Jones, West. Bot. Contrib. 16: 13. 1930. Arizona, Jones 24697, 24698.
- (11) *Setaria magna* Griseb., Fl. Brit. W. Ind. 554. 1864. Jamaica, Purdie.
- Chamaeraphis magna* Beal, Grasses N. Amer. 2: 152. 1896. Based on *Setaria magna* Griseb.
- Chaetochloa magna* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 4: 39. 1897. Based on *Setaria magna* Griseb.
- Setaria nigrirostris* (Nees) Dur. and Schinz, Consp. Fl. Afr. 5: 774. 1894. Based on *Panicum nigrirostris* Nees.
- Panicum nigrirostris* Nees, Fl. Afr. Austr. 55. 1841. South Africa.
- Chaetochloa nigrirostris* Skeels, U. S. Dept. Agr., Bur. Plant Indus. Bul. 207: 22. 1911. Based on *Panicum nigrirostris* Nees.
- Setaria palmifolia* (Koen.) Stapf, Linn. Soc. Jour. Bot. 42: 186. 1914. Based on *Panicum palmifolium* Koen. (Naturforscher 23: 208. 1788, same as *P. palmifolium* Willd.)
- Panicum plicatum* Willd., Enum. Pl. 1033. 1809. Asia. Not *P. plicatum* Lam., 1791.
- Panicum palmifolium* Willd. ex Poir., in Lam., Encycl. Sup. 4: 282. 1816. Based on *P. plicatum* Willd.
- Chamaeraphis palmifolia* Kuntze, Rev. Gen. Pl. 2: 771. 1891. Based on *Panicum palmifolium* Willd.
- Chaetochloa palmifolia* Hitchc. and Chase, U. S. Natl. Herb. Contrib. 18: 348. 1917. Based on *Panicum palmifolium* Willd.
- Setaria poiretiana* (Schult.) Kunth, Rév. Gram. 1: 47. 1829. Based on *Panicum poiretianum* Schult.
- Panicum elongatum* Poir. in Lam., Encycl. Sup. 4: 278. 1816. Not *P. elongatum* Salisb., 1796, nor Pursh, 1814. Brazil.
- Panicum poiretianum* Schult., Mantissa 2: 229. 1824. Based on *P. elongatum* Poir.
- Chaetochloa poiretiana* Hitchc., U. S. Natl. Herb. Contrib. 22: 159. 1920. Based on *Panicum poiretianum* Schult.
- Setaria rariflora* Mikan ex Trin., in Spreng., Neu. Entd. 2: 78. 1821. Brazil.
- Chaetochloa rariflora* Hitchc. and Chase, U. S. Natl. Herb. Contrib. 18: 349. 1917. Based on *Setaria rariflora* Mikan.
- Panicum rariflorum* Makino and Nemoto, Fl. Jap. 1475. 1925. Not *P. rariflora* Lam., 1798. Based on *Setaria rariflora* Mikan.
- (7) *Setaria scheelei* (Steud.) Hitchc., Biol. Soc. Wash. Proc. 41: 163. 1928. Based on *Panicum scheelei* Steud.
- Setaria polystachya* Scheele, Linnaea 22: 339. 1849. Not *S. polystachya* Schrad., 1824. New Braunfels, Tex., Lindheimer 564.
- Panicum scheelei* Steud., Syn. Pl. Glum. 1: 51. 1854. Based on *Setaria polystachya* Scheele.
- Chaetochloa polystachya* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 21: 37. f. 22. 1900. Based on *Setaria polystachya* Scheele.
- Chaetochloa scheelei* Hitchc., U. S. Natl. Herb. Contrib. 12: 207. f. 62. 1920. Based on *Panicum scheelei* Steud.
- Setaria setosa* (Swartz) Beauv., Ess. Agrost. 51, 178. 1812. Based on *Panicum setosum* Swartz.
- Panicum setosum* Swartz, Prodr. Veg. Ind. Occ. 22. 1788. Jamaica, Swartz.
- Panicum caudatum* Lam., Tabl. Encycl. 1: 171. 1791. Brazil.
- Setaria caudata* Roem. and Schult., Syst. Veg. 2: 495. 1817. Based on *Panicum caudatum* Lam.
- Setaria setosa* var. *caudata* Griseb., Fl. Brit. W. Ind. 555. 1864. Based on *Setaria caudata* Roem. and Schult.
- Pennisetum swartzii* F. Muell., Fragm. Phyt. Austr. 8: 110. 1873. Based on *Panicum setosum* Swartz.
- Chamaeraphis setosa* Kuntze, Rev. Gen. Pl. 2: 768. 1891. Based on *Panicum setosum* Swartz.
- Chamaeraphis caudata* Britton, Ann. N. Y. Acad. Sci. 7: 264. 1893. Based on *Panicum caudatum* Lam.
- Chaetochloa setosa* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 4: 39. 1897. Based on *Panicum setosum* Swartz.
- Chaetochloa caudata* Scribn., Mo. Bot. Gard. Rpt. 10: 52. 1899. Based on *Panicum caudatum* Lam.
- Setaria sphacelata* (Schum.) Stapf and C. E. Hubb., Kew Bul. Misc. Inf. 1929: 184, 195. 1929 (basis not given); in Prain, Fl. Trop. Afr. 9: 795. 1930. Based on *Panicum sphacelatum* Schum.
- Panicum sphacelatum* Schum., Beskr. Guin. Pl. 78. 1827. Guinea, Africa.
- Setaria aurea* Hochst., Flora 24: 276. 1841. Abyssinia.
- (3) *Setaria verticillata* (L.) Beauv., Ess. Agrost. 51, 178. 1812. Based on *Panicum verticillatum* L.
- Panicum verticillatum* L., Sp. Pl. ed. 2. 1: 82. 1762. Europe.
- Pennisetum verticillatum* R. Br., Prodr. Fl.

- Nov. Holl. 195. 1810. Based on *Panicum verticillatum* L.
- Chamaeraphis italica* var. *verticillata* Kuntze, Rev. Gen. Pl. 2: 768. 1891. Based on *Panicum verticillatum* L.
- Chamaeraphis verticillata* Porter, Torrey Bot. Club Bul. 20: 196. 1893. Based on *Panicum verticillatum* L.
- Ixophorus verticillatus* Nash, Torrey Bot. Club Bul. 22: 422. 1895. Based on *Panicum verticillatum* L.
- Chaetochloa verticillata* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 4: 39. 1897. Based on *Panicum verticillatum* L.
- Chaetochloa brevispica* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 21: 15. f. 5. 1900. Published as a new name for *Panicum verticillatum* var. *parviflorum* Doell, the identity of which is uncertain. The plants described and figured by Scribner and Merrill are *S. verticillata*.
- Setaria brevispica* Schum. in Just's Bot. Jahresber. 28¹: 417. 1902. Based on *Chaetochloa brevispica* Scribn. and Merr.
- Chaetochloa verticillata* var. *brevisetata* (Godr.) Farwell, Mich. Acad. Sci. Papers 1: 86. 1921, based on a European type not examined.
- SETARIA VERTICILLATA VAR. AMBIGUA (Guss.) Parl., Fl. Palerm. 1: 36. 1845. Based on *Panicum verticillatum* var. *ambiguum* Guss.
- Panicum verticillatum* var. *ambiguum* Guss., Fl. Sic. Prodr. 80. 1827. Sicily.
- Setaria ambigua* Guss., Fl. Sic. Syn. 1: 114. 1842. Not *S. ambigua* Merat, 1836. Based on *Panicum verticillatum* var. *ambiguum* Guss.
- Setaria viridis* var. *ambigua* Coss. and Dur., Expl. Sci. Alger. 2: 36. 1854. Based on *S. ambigua* Guss.
- Panicum ambiguum* Hausskn., Oesterr. Bot. Ztschr. 25: 345. 1875. Based on *Setaria ambigua* Guss.
- Setaria viridis* var. *purpurascens* Peck ex Dudley, Cornell Univ. Bul. 2: 122. 1886. Not *S. viridis* var. *purpurascens* Peterm. 1838. New York, Peck.
- Chamaeraphis italica* var. *ambigua* Kuntze, Rev. Gen. Pl. 2: 768. 1891. Based on *Setaria ambigua* Guss.
- Chaetochloa ambigua* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 21: 18. f. 7. 1900. Based on *Setaria verticillata* var. *ambigua* Guss.
- (5) *Setaria villosissima* (Scribn. and Merr.) Schum., Just's Bot. Jahresber. 28¹: 417. 1902. Based on *Chaetochloa villosissima* Scribn. and Merr.
- Chaetochloa villosissima* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Bul. 21: 34. f. 19. 1900. San Diego, Tex., J. G. Smith in 1897.
- (12) *Setaria viridis* (L.) Beauv., Ess. Agrost. 51, 178. 1812. Based on *Panicum viride* L.
- Panicum viride* L., Syst. Nat. ed. 10. 2: 870. 1759. Europe.
- Pennisetum viride* R. Br., Prodr. Fl. Nov. Holl. 1: 195. 1810. Based on *Panicum viride* L.
- Setaria weinmanni* Roem. and Schult., Syst. Veg. 2: 490. 1817. Europe.
- Panicum viride* var. *brevisetum* Doell, Rhein. Fl. 128. 1843. Europe.
- Setaria viridis* var. *weinmanni* Borbás, Math. Termesz. Közlem. 15: 310. 1878. Based on *Setaria weinmanni* Roem. and Schult.
- Panicum italicum* var. *viride* Koern., in Koern. and Wern., Handb. Getreidebau. 1: 277. 1885. Based on *Panicum viride* L.
- Chamaeraphis italica* var. *viridis* Kuntze, Rev. Gen. Pl. 2: 767. 1891. Based on *Panicum viride* L.
- Chamaeraphis viridis* Millsp., W. Va. Agr. Expt. Sta. Bul. 2: 466. 1892. Based on *Panicum viride* L.
- Ixophorus viridis* Nash, Torrey Bot. Club Bul. 22: 423. 1895. Based on *Panicum viride* L.
- Chaetochloa viridis* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 4: 39. 1897. Based on *Panicum viride* L.
- Setaria viridis* var. *brevisetata* Hitchc., Rhodora 8: 210. 1906. Based on *Panicum viride* var. *brevisetum* Doell.
- Setaria italica* subsp. *viridis* Thell., Mém. Soc. Sci. Nat. Cherbourg 38: 85. 1912. Based on *Panicum viride* L.
- Chaetochloa viridis* var. *brevisetata* Farwell, Mich. Acad. Sci. Papers 1: 86. 1921. Based on *Panicum viride* var. *brevisetum* Doell.
- Chaetochloa viridis* var. *weinmanni* House, N. Y. State Mus. Bul. 243-244: 39. 1923. Based on *Setaria weinmanni* Roem. and Schult.
- Chaetochloa viridis* var. *major* (Gaudin) Farwell, Mich. Acad. Sci. Papers 1: 86. 1921, and *C. viridis* var. *minor* (Koch) Farwell (l.c.) based on European types not examined.

(65) SIEGLINGIA Bernh.

- (1) *Sieglingia decumbens* (L.) Bernh., Syst. Verz. Erf. 20: 44. 1800. Based on *Festuca decumbens* L.
- Festuca decumbens* L., Sp. Pl. 75. 1753. Europe.
- Poa decumbens* Scop., Fl. Carn. ed. 2. 1: 69. 1772. Based on *Festuca decumbens* L.
- Danthonia decumbens* Lam. and DC., Fl. Franç. ed. 3, 33. 1805. Based on *Festuca d'cumbens* L.
- Triodia decumbens* Beauv., Ess. Agrost. 76, 160. pl. 15. f. 9. 1812. Based on "*Danthonia decumbens* Decand."

SINOCALAMUS McClure

- Sinocalamus oldhami** (Munro) McClure,
Lingnan Univ. Sci. Bul. 9: 67. 1940.
Based on *Bambusa oldhami* Munro.
Bambusa oldhami Munro, Trans. Linn.
Soc. 26: 109. 1868. Formosa.

(47) SITANION Raf.

- (1) **Sitanion hanseni** (Scribn.) J. G. Smith,
U. S. Dept. Agr., Div. Agrost. Bul. 18:
20. 1899. Based on *Elymus hanseni*
Scribn.
Elymus hanseni Scribn., U. S. Dept. Agr.,
Div. Agrost. Bul. 11: 56. f. 12. 1898.
Amador County, Calif., *Hansen* 1742.
Sitanion planifolium J. G. Smith, U. S.
Dept. Agr., Div. Agrost. Bul. 18: 19.
1899. Skamania County, Wash., *Suks-*
dorf 224.
Sitanion anomalum J. G. Smith, U. S.
Dept. Agr., Div. Agrost. Bul. 18: 20.
pl. 4. 1899. Pasadena, Calif., *Allen* in
1885.
Sitanion leckenbyi Piper, *Erythea* 7: 100.
1899. Wawawai, Wash., *Piper* 3003.
Sitanion rubescens Piper, *Torrey Bot.*
Club Bul. 30: 234. 1903. Mount
Rainier, Wash., *Piper* 1954.
Elymus leckenbyi Piper, U. S. Natl. Herb.
Contrib. 11: 151. 1906. Based on
Sitanion leckenbyi Piper.
Sitanion hanseni anomalum Hitchc., Biol.
Soc. Wash. Proc. 41: 160. 1928.
Based on *S. anomalum* J. G. Smith.
- (3) **Sitanion hystrix** (Nutt.) J. G. Smith,
U. S. Dept. Agr., Div. Agrost. Bul. 18:
15. pl. 2. 1899. Based on *Aegilops*
hystrix Nutt.
Aegilops hystrix Nutt., Gen. Pl. 1: 86.
1818. Plains of the Missouri.
Sitanion elymoides Raf., Jour. Phys.
Chym. 89: 103. 1819. Missouri [River].
Elymus sitanion Schult., Mantissa 2: 426.
1824. Based on *Sitanion elymoides* Raf.
Polyanthrix hystrix Nees, Ann. Nat. Hist.
1: 284. 1838. Based on *Aegilops hystrix*
Nutt., but misapplied to *S. jubatum*.
Elymus elymoides Swezey, Nebr. Pl.
Doane Col. 15. 1891. Based on *Sitan-*
ion elymoides Raf.
Sitanion minus J. G. Smith, U. S. Dept.
Agr., Div. Agrost. Bul. 18: 12. 1899.
Jacumba Hot Springs, Calif., *Schoene-*
feldt 3277.
Sitanion rigidum J. G. Smith, U. S. Dept.
Agr., Div. Agrost. Bul. 18: 13. 1899.
Cascade Mountains, Wash., *Allen* 178.
Sitanion californicum J. G. Smith, U. S.
Dept. Agr., Div. Agrost. Bul. 18: 13.
1899. San Bernardino Mountains, Calif.,
Parish 3295.
Sitanion glabrum J. G. Smith, U. S. Dept.
Agr., Div. Agrost. Bul. 18: 14. 1899.
Coso Mountains, Calif., *Coville* and
Funston 914.
Sitanion cinereum J. G. Smith, U. S.
Dept. Agr., Div. Agrost. Bul. 18: 14.
1899. Reno, Nev., *Tracy* 222.
Sitanion insulare J. G. Smith, U. S.
Dept. Agr., Div. Agrost. Bul. 18: 14.
1899. Carrington Island, Salt Lake,
Utah, *Watson* 1338.
Chretomeris trichoides Nutt. ex J. G.
Smith, U. S. Dept. Agr., Div. Agrost.
Bul. 18: 15. 1899, as synonym of
Sitanion hystrix.
Elymus difformis Nutt. ex J. G. Smith,
U. S. Dept. Agr., Div. Agrost. Bul. 18:
15. 1899, as synonym of *Sitanion*
hystrix.
Sitanion montanum J. G. Smith, U. S.
Dept. Agr., Div. Agrost. Bul. 18: 16.
1899. Spanish Creek, Mont., *Rydberg*
3091.
Sitanion caespitosum J. G. Smith, U. S.
Dept. Agr., Div. Agrost. Bul. 18: 16.
1899. Cliff, N. Mex., *J. G. Smith* in
1897.
Sitanion strigosum J. G. Smith, U. S.
Dept. Agr., Div. Agrost. Bul. 18: 17.
1899. Sheep Creek, Mont., *Rydberg*
3298.
Sitanion molle J. G. Smith, U. S. Dept.
Agr., Div. Agrost. Bul. 18: 17. 1899.
Larimer County, Colo., *Shear* and
Bessey 1469.
Sitanion brevifolium J. G. Smith, U. S.
Dept. Agr., Div. Agrost. Bul. 18: 17.
1899. Tucson, Ariz., *Toumey* 797.
Sitanion longifolium J. G. Smith, U. S.
Dept. Agr., Div. Agrost. Bul. 18: 18.
1899. Silverton, Colo., *Shear* 1213.
Sitanion pubiflorum J. G. Smith, U. S.
Dept. Agr., Div. Agrost. Bul. 18: 19.
1899. Tucson, Ariz., *Toumey* 795.
Sitanion latifolium Piper, *Erythea* 7: 99.
1899. Blue Mountains, Walla Walla
County, Wash., *Piper* in 1896.
Sitanion marginatum Scribn. and Merr.,
Torrey Bot. Club Bul. 29: 469. 1902.
Leigh Lake, Teton Mountains, Wyo.,
Merrill and *Wilcox* 334.
Elymus glaber Davy, Calif. Univ. Pubs.,
Bot. 1: 57. 1902. Based on *Sitanion*
glabrum J. G. Smith.
Elymus pubiflorus Davy, Calif. Univ.
Pubs., Bot. 1: 58. 1902. Based on
Sitanion pubiflorum J. G. Smith.
Sitanion velutinum Piper, *Torrey Bot.*
Club Bul. 30: 233. 1903. Steptoe,
Wash., *G. R. Vasey* in 1901.
Sitanion basalticola Piper, *Torrey Bot.*
Club Bul. 30: 234. 1903. Coulee City,
Wash., *Piper* 3924.
Sitanion albescens Elmer, Bot. Gaz. 36: 57.
1903. Ellensburg, Wash., *Whited* 670.
Sitanion ciliatum Elmer, Bot. Gaz. 36:
58. 1903. Wenatchee, Wash., *Whited*
in 1901.
Hordeum elymoides Schenck, Bot. Jahrb.
Engler 40: 109. 1907. Based on *Sitan-*
ion elymoides Raf.
Elymus brevifolius Jones, West. Bot.

- Contrib. 14: 20. 1912. Based on *Sitanion brevifolium* J. G. Smith.
- Elymus hystrix* Jones, West. Bot. Contrib. 14: 20. 1912. Not *E. hystrix* L. Based on *Aegilops hystrix* Nutt.
- Elymus insularis* Jones, West. Bot. Contrib. 14: 20. 1912. Based on *Sitanion insulare* J. G. Smith.
- Elymus minor* Jones, West. Bot. Contrib. 14: 20. 1912. Based on *Sitanion minus* J. G. Smith.
- Sitanion rigidum* var. *californicum* Smiley, Calif. Univ. Pubs., Bot. 9: 99. 1921. Based on *S. californicum* J. G. Smith.
- Sitanion hordeoides* Suksdorf, Werdenda 1²: 4. 1923. Spangle, Wash., Suksdorf 8705.
- (2) *Sitanion jubatum* J. G. Smith, U. S. Dept. Agr., Div. Agrost. Bul. 18: 10. 1899. Waitsburg, Wash., Horner 573.
- Elymus sitanion jubatum* J. G. Smith, U. S. Dept. Agr., Div. Agrost. Bul. 18: 10. 1899, as synonym of *S. jubatum*.
- Sitanion villosum* J. G. Smith, U. S. Dept. Agr., Div. Agrost. Bul. 18: 11. pl. 1. 1899. Almoda, Wash., Elmer 266.
- Sitanion multisetum* J. G. Smith, U. S. Dept. Agr., Div. Agrost. Bul. 18: 11. 1899. Tehachapi Valley, Calif., Coville and Funston 1121.
- Sitanion polyanthrix* J. G. Smith, U. S. Dept. Agr., Div. Agrost. Bul. 18: 12. 1899. California, Douglas. New name given to the species described by Nees under *Polyanthrix hystrix*, that name being based on *Aegilops hystrix* Nutt.
- Sitanion brevistaratum* J. G. Smith, U. S. Dept. Agr., Div. Agrost. Bul. 18: 12. 1899. Panamint Mountains, Calif., Coville and Funston 833.
- Sitanion strictum* Elmer, Bot. Gaz. 36: 59. 1903. Parker, Wash., Elmer in 1898.
- Elymus multisetus* Jones, West. Bot. Contrib. 14: 20. 1912. Based on *Sitanion multisetum* J. G. Smith.
- (157) **SORGHASTRUM** Nash
- (2) *Sorghastrum elliottii* (Mohr) Nash, N. Amer. Fl. 17: 130. 1912. Based on *Chrysopogon elliottii* Mohr.
- Chrysopogon elliottii* Mohr, Torrey Bot. Club Bul. 24: 21. 1897. Based on *Andropogon nutans* as described by Elliott, not *A. nutans* L.
- (1) *Sorghastrum nutans* (L.) Nash in Small, Fl. Southeast. U. S. 66. 1903. Based on *Andropogon nutans* L.
- Andropogon nutans* L., Sp. Pl. 1045. 1753. "Virginia, Jamaica." [Type eastern America, Kalm; cited localities erroneous.]
- ?*Stipa villosa* Walt., Fl. Carol. 78. 1788. South Carolina.
- Andropogon avenaceus* Michx., Fl. Bor. Amer. 1: 58. 1803. Illinois, Michaux.
- Andropogon ciliatus* Ell., Bot. S. C. and Ga. 1: 144. 1816. Port Royal, S. C.
- Andropogon arenaceus* Raf., West. Rev. Misc. Mag. 1: 95. 1819. Error for *A. avenaceus*.
- Sorghum nutans* A. Gray, Man. 617. 1848. Based on *Andropogon nutans* L.
- Sorghum avenaceum* Chapm., Fl. South. U. S. 583. 1860. Based on *Andropogon avenaceus* Michx.
- Chrysopogon nutans* Benth., Linn. Soc. Jour. Bot. 19: 73. 1881. Based on *Andropogon nutans* L.
- Chrysopogon avenaceus* Benth., Linn. Soc. Jour. Bot. 19: 73. 1881. Based on *Andropogon avenaceus* Michx.
- Sorghum nutans* subsp. *avenaceum* Hack. in Mart., Fl. Bras. 2³: 274. 1883. Based on *Andropogon avenaceus* Michx.
- Sorghum nutans* subsp. *linnaeanum* Hack. in Mart., Fl. Bras. 2³: 276. 1883. Based on *Andropogon nutans* L.
- Andropogon albescens* Fourn., Mex. Pl. 2: 56. 1886. Vera Cruz, Mexico, Gouin 53.
- Andropogon confertus* Trin. ex Fourn., Mex. Pl. 2: 55. 1886. Texas, Berlandier 1873.
- Andropogon nutans* var. *avenaceus* Hack. in DC., Monogr. Phan. 6: 530. 1889. Based on *Andropogon avenaceus* Michx.
- Andropogon nutans* var. *linnaeanus* Hack. in DC., Monogr. Phan. 6: 531. 1889. Based on *Sorghum nutans* subsp. *linnaeanum* Hack.
- Chrysopogon nutans* var. *avenaceus* Coville and Branner, Rpt. Geol. Surv. Ark. 4: 234. 1891. Based on *Andropogon avenaceus* Michx.
- Poranthera nutans* Raf. ex Jacks., Ind. Kew. 2: 606. 1894, as synonym of *Chrysopogon nutans*.
- Poranthera ciliata* Raf. ex Jacks., Ind. Kew. 2: 606. 1894, as synonym of *Chrysopogon avenaceus*.
- Chrysopogon nutans* var. *linnaeanus* Mohr, Torrey Bot. Club Bul. 24: 21. 1897. Based on *Sorghum nutans* subsp. *linnaeanum* Hack.
- Sorghastrum avenaceum* Nash in Britton, Man. 71. 1901. Based on *Andropogon avenaceus* Michx.
- Andropogon linnaeanus* Scribn. and Kear. in Scribn. and Ball., U. S. Dept. Agr., Div. Agrost. Bul. 24: 40. 1901. Based on *Sorghum nutans* subsp. *linnaeanum* Hack.
- Sorghastrum linnaeanum* Nash in Small, Fl. Southeast. U. S. 66. 1903. Based on *Andropogon nutans* var. *linnaeanus* Hack., but misapplied to *S. elliottii* (Mohr) Nash.
- Holcus nutans* Kuntze ex Stuck., An. Mus. Nac. Buenos Aires 11: 48. 1904. Presumably based on *Andropogon nutans* L.
- Holcus nutans* var. *avenaceus* Hack. ex

- Stuck., An. Mus. Nac. Buenos Aires 11: 48. 1904. Presumably based on *Andropogon avenaceus* Michx.
Chalcoelytrum nutans Lunell, Amer. Midl. Nat. 4: 212. 1915. Based on *Andropogon nutans* L.
 (3) *Sorghastrum secundum* (Ell.) Nash in Small, Fl. Southeast. U. S. 67. 1903. Based on *Andropogon secundus* Ell.
Andropogon secundus Ell., Bot. S. C. and Ga. 1: 580. 1821. Between Flint and Chattahoochee Rivers, Ga.
Sorghum secundum Chapm., Fl. South. U. S. 583. 1860. Based on *Andropogon secundus* Ell.
Chrysopogon secundus Benth. ex Vasey, Grasses U. S. 20. 1883. Based on *Sorghum secundum* Chapm.
Andropogon unilateralis Hack. in DC., Monogr. Phan. 6: 533. 1889. Based on *Sorghum secundum* Chapm.

(156) SORGHUM Moench

- (1) *Sorghum halepense* (L.) Pers., Syn. Pl. 1: 101. 1805. Based on *Holcus halepensis* L.
Holcus halepensis L., Sp. Pl. 1047. 1753. Syria.
Blumenbachia halepensis Koel., Descr. Gram. 29. 1802. Based on *Holcus halepensis* L.
Milium halepense Cav., Descr. Pl. 306. 1802. Based on *Holcus halepensis* L.
Andropogon halepensis Brot., Fl. Lusit. 1: 89. 1804. Based on *Holcus halepensis* L.
Andropogon sorghum subsp. *halepensis* Hack. in DC., Monogr. Phan. 6: 501. 1889. Based on *Holcus halepensis* L.
Andropogon halepensis var. *anatherus* Piper, Biol. Soc. Wash. Proc. 28: 28. 1915. Marco, Fla., Hitchcock Fla. Pl. 1900. Spikelets awnless.
Sorghum lanceolatum Stapf, in Prain, Fl. Trop. Afr. 9: 112. 1917. Tropical Africa.
Sorghum sudanense (Piper) Stapf in Prain, Fl. Trop. Afr. 9: 113. 1917. Based on *Andropogon sorghum sudanensis* Piper.
Andropogon sorghum sudanensis Piper, Biol. Soc. Wash. Proc. 28: 33. 1915. Grown at Arlington Farm (near Washington, D. C.), seed from Sudan.
Holcus sorghum sudanensis Hitchc., Biol. Soc. Wash. Proc. 29: 128. 1916. Based on *Andropogon sorghum sudanensis* Piper.
Holcus sudanensis Bailey, Gentes Herb. 1: 132. 1923. Based on *Andropogon sorghum sudanensis* Piper.
Sorghum vulgare var. *sudanense* Hitchc., Wash. Acad. Sci. Jour., 17: 147. 1927. Based on *Andropogon sorghum* var. *sudanense* Piper.
Sorghum virgatum (Hack.) Stapf in Prain, Fl. Trop. Afr. 9: 111. 1917. Based on *Andropogon sorghum* subsp. *halepensis* var. *virgatus* Hack.
Andropogon sorghum subsp. *halepensis* var. *virgatus* Hack.
Andropogon sorghum subsp. *halepensis* var. *virgatus* Hack. in DC., Monogr. Phan. 6: 504. 1889. Egypt.
Holcus virgatus Bailey, Gentes Herb. 1: 132. 1923. Based on *Andropogon sorghum* subsp. *halepensis* var. *virgatus* Hack.
 (2) *Sorghum vulgare* Pers., Syn. Pl. 1: 101. 1805. Based on *Holcus sorghum* L.
Holcus sorghum L., Sp. Pl. 1047. 1753. India.
Holcus bicolor L., Mant. Pl. 2: 301. 1771. Persia.
Sorghum bicolor Moench, Meth. Pl. 207. 1794. Based on *Holcus bicolor* L.
Andropogon sorghum Brot., Fl. Lusit. 1: 88. 1804. Based on *Holcus sorghum* L.
Holcus cernuus Muhlb., Descr. Gram. 276. 1817. Garden plant.
Andropogon vulgaris Raspail, Ann. Sci. Nat., Bot. 5: 307. 1825. Based on *Sorghum vulgare* Pers.
Sorghum vulgare var. *bicolor* Eaton and Wright, N. Amer. Bot. ed. 8. 438. 1840. Not *S. vulgare* var. *bicolor* Schrad., 1838. North America.
Sorghum sorghum Karst., Deut. Fl. 367. f. 189. 1880. Based on *Holcus sorghum* L.
Andropogon sorghum var. *sativus* Hack. in DC., Monogr. Phan. 6: 505. 1889. Group name.
Andropogon sorghum subsp. *sativus* var. *vulgaris* Hack. in DC., Monogr. Phan. 6: 515. 1889. Based on *Sorghum vulgare* Pers.
Andropogon sorghum var. *vulgaris* Hack. ex Hook. f., Fl. Brit. Ind. 7: 184. 1896. Based on *A. sorghum* subsp. *sativus* var. *vulgaris* Hack.
 SORGHUM VULGARE VAR. CAFFRORUM (Retz.) Hubb. and Rehder, Harvard Univ. Bot. Mus. Leaflet 1: 10. 1932. Based on *Holcus caffrorum* Thunb., the same as *Panicum caffrorum* Retz.
Panicum caffrorum Retz., Obs. Bot. 2: 7. 1781. Cape of Good Hope, Africa, grown under the name "Caffer-korn."
Holcus caffrorum Thunb., Prodr. Pl. Cap. 1: 20. 1794. Cape of Good Hope.
Sorghum caffrorum Beauv., Ess. Agrost. 131, 164, 178. 1812. Based on *Holcus caffrorum* Thunb.
Holcus sorghum var. *caffrorum* Bailey, Gentes Herb. 1: 133. 1923. Based on *Holcus caffrorum* Thunb. Retz. publication not cited.
 SORGHUM VULGARE VAR. DRUMMONDII (Nees) Hack. ex Chiov., Result. Sci. Miss. Stefan.-Paoli Somal. Ital. 1 Coll. Bot. 224. 1916. Based on *Andropogon drummondii* Nees in Steud.
Andropogon drummondii Nees in Steud., Syn. Pl. Glum. 1: 393. 1854. New Orleans, La., Drummond 588.

- Andropogon sorghum* subsp. *sativus* var. *drummondii* Hack. in DC., Monogr. Phan. 6: 507. 1889. Based on *Andropogon drummondii* Nees.
- Sorghum drummondii* Nees ex Hack., in DC., Monogr. Phan. 6: 507. 1889, as synonym of *Andropogon sorghum* subsp. *sativus* var. *drummondii* Hack.
- Sorghum drummondii* Millsp. and Chase, Field Columb. Mus. Publ. Bot. 3: 21. 1903. Based on *Andropogon drummondii* Nees.
- Holcus sorghum drummondii* Hitchc., Biol. Soc. Wash. Proc. 29: 128. 1916. Based on *Andropogon drummondii* Nees.
- SORGHUM VULGARE var. DURRA (Forsk.) Hubb. and Rehder, Harvard Univ. Bot. Mus. Leaflets 1: 10. 1932. Based on *Holcus durra* Forsk.
- Holcus durra* Forsk., Fl. Aegypt. Arab. 174. 1775. Egypt and Arabia.
- Andropogon sorghum* subsp. *sativus* var. *durra* Hack., in DC., Monogr. Phan. 6: 516. 1889. Based on *Holcus durra* Forsk.
- Holcus sorghum* var. *durra* Bailey, Gentes Herb. 1: 132. 1923. Based on *Holcus durra* Forsk.
- SORGHUM VULGARE var. ROXBURGHII (Stapf) Haines, Bot. Bihar and Orissa pt. 5: 1034. 1924. Based on *Sorghum roxburghii* Stapf.
- Sorghum roxburghii* Stapf in Prain, Fl. Trop. Afr. 9: 126. 1917. Africa.
- SORGHUM VULGARE var. SACCHARATUM (L.) Boerl., Ann. Jard. Bot. Buitenzorg 8: 69. 1890. Based on *Sorghum saccharatum* Pers.
- Holcus saccharatus* L., Sp. Pl. 1047. 1753. India.
- Sorghum saccharatum* Moench, Meth. Pl. 207. 1794. Based on *Holcus saccharatus* L. Listed as new Pers., Syn. Pl. 1: 101. 1805, same basis.
- Andropogon saccharatus* Raspail, Ann. Sci. Nat., Bot. 5: 307. 1825. Based on *Sorghum saccharatum* Pers.
- Andropogon sorghum* var. *saccharatus* Alefeld, Landw. Fl. 313. 1866. Based on *Holcus saccharatus* L.
- Sorghum halepense* var. *saccharatum* Goiran, Nuov. Gior. Bot. Ital. n. s. 17: 39. 1910. Based on *Holcus saccharatus* L.
- Holcus sorghum* var. *saccharatus* Bailey, Gentes Herb. 1: 132. 1923. Based on *Holcus saccharatus* L.
- SORGHUM VULGARE var. TECHNICUM (Koern.) Jav. Magyar Fl. 1: 63. 1924. Based on *Andropogon sorghum* var. *technicus* Koern.
- Andropogon sorghum* var. *technicus* Koern. in Koern. and Wern., Handb. Getreidebau. 1: 308. 1885. Cultivated.
- Andropogon sorghum* subsp. *sativus* var. *technicus* Koern. ex Hack., in DC., Monogr. Phan. 6: 508. 1889. Based on *A. sorghum* var. *technicus* Koern.
- Holcus saccharatus* var. *technicus* Farwell, Mich. Acad. Sci. Ann. Rpt. 20: 163. 1918. Based on *Andropogon sorghum* var. *technicus* Koern.
- Holcus sorghum* var. *technicus* Bailey, Gentes Herb. 1: 132. 1923. Based on *Andropogon sorghum* var. *technicus* Koern.

(107) SPARTINA Schreb.

- (4) *Spartina alterniflora* Loisel., Fl. Gall. 719. 1807. France.
- Dactylis maritima* Walt., Fl. Carol. 77. 1788. Not *D. maritima* Curtis, 1787. South Carolina.
- Trachynotia alterniflora* DC., Fl. Franc. 5: 279. 1815. Based on *Spartina alterniflora* Loisel.
- Spartina glabra* Muhl. ex Ell., Bot. S. C. and Ga. 1: 95. pl. 4. f. 2. 1816. South Carolina and Georgia. Name only, Muhl., Cat. Pl. 8. 1813.
- Limnietis glabra* Nutt., Gen. Pl. 1: 38. 1818, name only; Eaton and Wright, N. Amer. Bot. 301. 1840. Presumably based on *Spartina glabra* Muhl.
- Spartina laevigata* Bosc ex Spreng., Schrad. and Link, Jahrb. Gewächsk. 13: 92. 1820. North America, Bosc.
- Trachynotia alternifolia* Steud., Nom. Bot. ed. 2. 2: 695. 1841, error for *T. alterniflora*.
- Spartina stricta* var. *alterniflora* A. Gray, Man. ed. 2. 552. 1856. Based on *S. alterniflora* Loisel.
- Spartina stricta* var. *glabra* A. Gray, Man. ed. 2. 552. 1856. Based on *S. glabra* Muhl.
- Spartina stricta maritima* Scribn., Torrey Bot. Club Mem. 5: 45. 1894. Based on *Dactylis maritima* Walt.
- Spartina glabra alterniflora* Merr., U. S. Dept. Agr., Bur. Plant Indus. Bul. 9: 9. 1902. Based on *Spartina alterniflora* Loisel.
- Spartina glabra pilosa* Merr., U. S. Dept. Agr., Bur. Plant Indus. Bul. 9: 9. 1902. Atlantic City, N. J., Scribner in 1895.
- Spartina alterniflora* var. *glabra* Fernald, Rhodora 18: 178. 1916. Based on *S. glabra* Muhl.
- Spartina alterniflora* var. *pilosa* Fernald, Rhodora 18: 179. 1916. Based on *S. glabra pilosa* Merr.
- Spartina maritima* subsp. *glabra* var. *glabra* St.-Yves, Candollea 5: 24, 49. pl. 1. f. b-2. 1932. Based on *S. glabra* Muhl.
- Spartina maritima* subsp. *glabra* var. *alterniflora* St.-Yves, Candollea 5: 25, 53. pl. 2. f. a-4. 1932. Based on *S. alterniflora* Loisel.
- Spartina maritima* subsp. *glabra* subvar.

- pilosa* St.-Yves, Candollea 5: 51. pl. 1. f. c-3. 1932. Based on *S. glabra pilosa* Merr.
- × *Spartina merrillii* Chevalier, Bul. Soc. France 80: 787. pl. 8. f. 3. 1933. Long Island, N. Y., Bicknell 11300.
- (6) *Spartina bakeri* Merr., U. S. Dept. Agr., Bur. Plant Indus. Bul. 9: 14. 1902. Lake Ola, Fla., C. H. Baker 14.
- Spartina juncea* var. *bakeri* St.-Yves, Candollea 5: 27, 91. pl. 9. f. c. 1932. Based on *S. bakeri* Merr.
- (7) *Spartina caespitosa* A. A. Eaton, Torrey Bot. Club Bul. 25: 338. 1898. Seabrook, N. H., A. A. Eaton.
- Spartina patens* var. *caespitosa* Hitchc., Rhodora 8: 210. 1906. Based on *S. caespitosa* A. A. Eaton.
- (2) *Spartina cynosuroides* (L.) Roth, Catal. Bot. 3: 10. 1806. Based on *Dactylis cynosuroides* L.
- Dactylis cynosuroides* L., Sp. Pl. 71. 1753. Virginia, Canada.
- Trachynotia polystachya* Michx., Fl. Bor. Amer. 1: 64. 1803. New England to Florida. [Type, South Carolina, Michaux.]
- Trachynotia cynosuroides* Michx., Fl. Bor. Amer. 1: 64. 1803. Based on *Dactylis cynosuroides* L., but misapplied to *S. pectinata*.
- Paspalum cynosuroides* Brot., Fl. Lusit. 1: 83. 1804. Based on *Dactylis cynosuroides* L.
- Limnetis cynosuroides* L. Rich. in Pers., Syn. Pl. 1: 72. 1805. Based on *Dactylis cynosuroides* L.
- Limnetis polystachia* L. Rich. in Pers., Syn. Pl. 1: 72. 1805. Based on *Trachynotia polystachya* Michx.
- Spartina polystachya* Beauv., Ess. Agrost. 25, 178, 179. 1812. Presumably based on *Trachynotia polystachya* Michx.
- Cynodon cynosuroides* Raspail, Ann. Sci. Nat., Bot. 5: 303. 1825. Based on *Spartina cynosuroides* Roth.
- Spartina cynosuroides* var. *polystachya* Beal, Grasses N. Amer. 2: 398. 1896. Based on *Trachynotia polystachya* Michx.
- (3) *Spartina foliosa* Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 114. 1840. California.
- Spartina leiantha* Benth., Bot. Voy. Sulph. 56. 1844. Bay of Magdalena, Baja California [Barclay].
- Spartina densiflora* var. *typica* subvar. *brongniartii* forma *acuta* St.-Yves, Candollea 5: 76, 81. 1932. Eureka, Calif. [Heller 13871.]
- (8) *Spartina gracilis* Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 110. 1840. North America.
- (9) *Spartina patens* (Ait.) Muhl., Descr. Gram. 55. 1817. Based on *Dactylis patens* Ait.
- Dactylis patens* Ait., Hort. Kew. 1: 104. 1789. Grown in England, seed from North America.
- Spartina pumila* Roth, Catal. Bot. 3: 10. 1806. New York.
- Spartina juncea* var. *patens* St.-Yves, Candollea 5: 27, 86. 1932. Based on *Dactylis patens* Ait.
- SPARTINA PATENS var. MONOGYNA (M. A. Curtis) Fernald, Rhodora 49: 114. 1947. Based on *Limnetis juncea* var. *monogyna* M. A. Curtis.
- Trachynotia juncea* Michx., Fl. Bor. Amer. 1: 64. 1803. South Carolina and Georgia, Michaux.
- Limnetis juncea* L. Rich. in Pers., Syn. Pl. 1: 72. 1805. Based on *Trachynotia juncea* Michx.
- Spartina juncea* Willd., Enum. Pl. 81. 1809. Based on *Trachynotia juncea* Michx.
- Limnetis juncea* var. *monogyna* M. A. Curtis, Boston Jour. Nat. Hist. 1: 136. 1835. Mouth of Cape Fear River, N. C.
- Spartina americana* Roth ex Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 109. 1840, as synonym of *S. juncea* Willd.
- Spartina patens* var. *juncea* Hitchc., Rhodora 8: 210. 1906. Based on *Trachynotia juncea* Michx.
- Spartina juncea* subvar. *americana* St.-Yves, Candollea 5: 27, 84. pl. 8. f. b-20. 1932. Based on *S. juncea* Willd.
- (1) *Spartina pectinata* Link, Jahrb. Gewächsk. 1³: 92. 1820. North America [type collected by Bosc probably at Wilmington, N. C.].
- Spartina cynosuroides* var. *aureo-marginata* Irving, Gard. Chron. 38: 372. 1905. Grown at Kew Gardens, received from New York Botanical Garden.
- Spartina michauxiana* Hitchc., U. S. Natl. Herb. Contrib. 12: 153. 1908. Based upon the plant described by Michaux as *Trachynotia cynosuroides* (that name based on *Dactylis cynosuroides* L.). [Near Hudson Bay, Michaux.]
- Spartina michauxiana* var. *suttiei* Farwell, Mich. Acad. Sci. Rpt. 21: 352. 1920. Orchard Lake, Mich., Suttie.
- Spartina michauxiana* var. *tenuior* Farwell, Mich. Acad. Sci. Rpt. 21: 352. 1920. River Rouge, Mich., [Farwell] 5138.
- Spartina cynosuroides* var. *michauxiana* St.-Yves, Candollea 5: 58. pl. 3 f. a-7. 1932. Based on *S. michauxiana* Hitchc.
- Spartina cynosuroides* var. *michauxiana* forma *major* St.-Yves, Candollea 5: 61, 62. 1932. Canada, Victorin 11358; Victorin and Germain 9055; other specimens cited from Nova Scotia, Newfoundland, Massachusetts, Ohio, Illinois, Minnesota, and Missouri.
- Spartina cynosuroides* × *gracilis* St.-Yves, Candollea 5: 66. pl. 4. f. b-10. 1932.

* * * "Oregon, Ballards Landing, *Cusick* 221 in 1890" [error for 2221 in 1899].

Spartina pectinata var. *suttiei* Fernald, *Rhodora* 35: 260. 1933. Based on *S. michauxiana* var. *suttiei* Farwell.

- (5) *Spartina spartinae* (Trin.) Merr., U. S. Dept. Agr., Bur. Plant Indus. Bul. 9: 11. 1902, as synonym of *S. junciformis* Engelm. and Gray ex Hitchc., U. S. Natl. Herb. Contrib. 17: 329. 1913. Based on *Vilfa spartinae* Trin.

Vilfa spartinae Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4: 82. 1840. Texas.

Spartina junciformis Engelm. and Gray, Bost. Soc. Nat. Hist. Jour. 5: 238. 1845. Texas, Lindheimer [207].

Spartina gouvini Fourn., Mex. Pl. 2: 135. 1886. Vera Cruz, Gouin 72.

Spartina multiflora Vasey ex Beal, Grasses N. Amer. 2: 400. 1896, as synonym of *S. junciformis* Engelm. and Gray.

Spartina pittieri Hack., Oesterr. Bot. Ztschr. 52: 237. 1902. Costa Rica, Pittier 4209.

Spartina densiflora var. *junciformis* St.-Yves, Candollea 5: 26, 77. pl. 7. f. a-16. 1932. Based on *S. junciformis* Engelm. and Gray.

(56) SPHENOPHOLIS Scribn.

- (5) *Sphenopholis filiformis* (Chapm.) Scribn., *Rhodora* 8: 144. 1906. Based on *Eatonia pennsylvanica* var. *filiformis* Chapm.

Eatonia pennsylvanica var. *filiformis* Chapm., Fl. South. U. S. 560. 1860. Florida [type, Chapman] to South Carolina.

Eatonia filiformis Vasey, Bot. Gaz. 11: 117. 1886. Based on *Eatonia pennsylvanica* var. *filiformis* Chapm.

Eatonia hybrida Vasey ex Beal, Grasses N. Amer. 2: 491. 1896. Florida, Curtiss in 1886. (The Hunting Creek, Va., specimen referred to is *Trisetum pennsylvanicum* (L.) Beauv., which see.)

Reboulea filiformis Farwell, Mich. Acad. Sci. Rpt. 17: 182. 1916. Based on *Eatonia pennsylvanica* var. *filiformis* Chapm.

- (2) *Sphenopholis intermedia* (Rydb.) Rydb., Torrey Bot. Club Bul. 36: 533. 1909. Based on *Eatonia intermedia* Rydb.

Koeleria truncata var. *major* Torr., Fl. North. and Mid. U. S. 1: 117. 1823. Deerfield, Mass., Cooley.

Koeleria? pennsylvanica var. *major* Torr., Fl. N. Y. 2: 469. 1843. Based on *Koeleria truncata* var. *major* Torr.

Reboulea pennsylvanica var. *major* A. Gray, Man. 591. 1848. Presumably based on *Koeleria pennsylvanica* var. *major* Torr.

?*Aira controversa* Steud., Syn. Pl. Glum.

1: 224. 1854. Cincinnati and Miami, Ohio.

?*Aira capillacea* Frank ex Steud., Syn. Pl. Glum. 1: 224. 1854, as synonym of *A. controversa* Steud.

Eatonia pennsylvanica var. *major* A. Gray, Man. ed. 2. 558. 1856. Presumably based on *Koeleria truncata* var. *major* Torr.

Vilfa alba Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 89. 1862. Not *V. alba* Beauv., 1812. "Oregon, Spalding" (locality probably erroneous, the ticket on the type specimen crossed out).

Eatonia intermedia Rydb., Torrey Bot. Club Bul. 32: 602. 1905. East Gallatin Swamps, Mont., Rydberg 3174.

Sphenopholis pallens major Scribn., *Rhodora* 8: 145. 1906. Based on *Koeleria truncata* var. *major* Torr.

Sphenopholis pallens var. *major* Scribn. ex Robinson, *Rhodora* 10: 65. 1908. Based on *Koeleria truncata* var. *major* Torr.

Reboulea pallens var. *major* Farwell, Mich. Acad. Sci. Rpt. 17: 182. 1916. Based on *Koeleria truncata* var. *major* Torr.

This is the species which has recently been called *Sphenopholis pallens* Scribn., but it is not the same as *Aira pallens* Bieler, on which that name is based.

- (3) *Sphenopholis longiflora* (Vasey) Hitchc., Wash. Acad. Sci. Jour. 23: 453. 1933. Based on *Eatonia pennsylvanica* var. *longiflora* Vasey.

Eatonia pennsylvanica var. *longiflora* Vasey ex L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 544. 1894. Houston, Tex., Nealley in 1892.

Eatonia longiflora Beal, Grasses N. Amer. 2: 494. 1896. Based on *E. pennsylvanica* var. *longiflora* Vasey.

Sphenopholis pallens longiflora Scribn., *Rhodora* 8: 145. 1906. Based on *Eatonia pennsylvanica* var. *longiflora* Vasey.

Reboulea pallens var. *longiflora* Farwell, Mich. Acad. Sci. Rpt. 17: 182. 1916. Based on *Eatonia longiflora* Beal.

- (4) *Sphenopholis nitida* (Bieler) Scribn., *Rhodora* 8: 144. 1906. Based on *Aira nitida* Bieler.

Aira nitida Bieler, Pl. Nov. Herb. Spreng. Cent. 8. 1807. Pennsylvania, Muhlenberg.

Aira pennsylvanica Spreng., Acad. St. Pétersb. Mém. 2: 299. pl. 7. 1807-08. Pennsylvania.

Koeleria pennsylvanica DC., Cat. Hort. Monsp. 117. 1813. Based on *Aira pennsylvanica* Spreng.

Aira mollis Muhl., Descr. Gram. 82. 1817. Not *A. mollis* Schreb., 1771. Pennsylvania. Name only in Muhl., Cat. Pl. 11. 1813.

Trisetum pennsylvanicum Trin., Acad. St.

- Pétersb. Mém. VI. Math. Phys. Nat. 1: 66. 1830. Not *T. pennsylvanicum* Beauv. Based on *Aira pennsylvanica* Spreng.
- Glyceria pennsylvanica* Heynh., Nom. 1: 361. 1840. Based on *Aira pennsylvanica* Spreng.
- Reboulea pennsylvanica* A. Gray, Man. 591. 1848. Based on *Koeleria pennsylvanica* DC.
- Eatonia pennsylvanica* A. Gray, Man. ed. 2. 558. 1856. Based on *Koeleria pennsylvanica* DC.
- Eatonia dudleyi* Vasey, Bot. Gaz. 11: 116. 1886. Michigan to Long Island and Pennsylvania to North Carolina. [Type, Ithaca, N. Y., *Dudley* in 1882.]
- Eatonia nitida* Nash, Torrey Bot. Club Bul. 22: 511. 1895. Based on *Aira nitida* Bieler.
- Eatonia glabra* Nash, in Britton, Man. 1043. 1901. Madison County, Tenn., *Bain* 507.
- Sphenopholis nitida glabra* Scribn., Rhodora 8: 145. 1906. Based on *Eatonia glabra* Nash.
- Sphenopholis nitida* var. *glabra* Scribn. ex Robinson, Rhodora 10: 65. 1908. Based on *Eatonia glabra* Nash.
- Sphenopholis glabra* Heller, Muhlenbergia 6: 12. 1910. Based on *Eatonia glabra* Nash.
- Reboulea nitida* Farwell, Mich. Acad. Sci. Rpt. 17: 181. 1916. Based on *Aira nitida* Bieler.
- Reboulea nitida* var. *glabra* Farwell, Mich. Acad. Sci. Rpt. 17: 181. 1916. Based on *Eatonia glabra* Nash.
- (1) *Sphenopholis obtusata* (Michx.) Scribn., Rhodora 8: 144. 1906. Based on *Aira obtusata* Michx.
- Aira obtusata* Michx., Fl. Bor. Amer. 1: 62. 1803. Carolina to Florida [type], *Michaux*.
- Aiopsis obtusata* Desv., Jour. Bot. 1: 200. 1808. Based on "*Agrostis*" [error for *Aira*] *obtusata* Michx.
- Festuca obtusata* Michx. ex Beauv., Ess. Agrost. 163. 1812. Name only, probably error for *Aira obtusata* Michx.
- Aira truncata* Muhl., Descr. Gram. 83. 1817. Pennsylvania. Name only, Muhl., Cat. Pl. 11. 1813.
- Koeleria paniculata* Nutt., Gen. Pl. 2: (Add. 2): 1818. East Florida, *T. Say*.
- Aira obtusa* Raf., Jour. de Phys. 89: 104. 1819. Name only under *Eatonia*. Doubtless either error for *A. obtusata* Michx. or change of name.
- Koeleria truncata* Torr., Fl. North. and Mid. U. S. 1: 116. 1823. Based on *Aira truncata* Muhl.
- Poa obtusata* Link, Hort. Berol 1: 76. 1827. Based on *Aira obtusata* Michx.
- Reboulea gracilis* Kunth, Rév. Gram. 2: 341. pl. 84. 1830. New England to Florida.
- Trisetum lobatum* Trin., Acad. St. Pétersb. Mém. VI. Math. Phys. Nat. 1: 66. 1830. North America.
- Agrostis obtusata* Steud., Nom. Bot. ed. 2. 1: 41. 1840, as synonym of *Aiopsis obtusata* Desv.
- Koeleria lobata* Trin. ex Steud., Nom. Bot. ed. 2. 1: 849. 1840. Not *K. lobata* Roem. and Schult., 1817. As synonym of *Reboulea gracilis* Kunth.
- Koeleria obtusata* Trin. ex Steud., Nom. Bot. ed. 2. 1: 849. 1840, as synonym of *Aiopsis obtusata* Desv.
- Reboulea obtusata* A. Gray, Man. 591. 1848. Based on *Aira obtusata* Michx.
- Eatonia obtusata* A. Gray, Man. ed. 2. 558. 1856. Based on *Aira obtusata* Michx.
- Reboulea truncata* Torr. ex Munro, Jour. Linn. Soc. Bot. 6: 43. 1862, as synonym of *R. gracilis* Kunth.
- Graphephorum densiflorum* Fourn., Soc. Bot. France Bul. 24: 182. 1877. Name only. Mexico [Texas], *Berlandier* 1617.
- Eatonia densiflora* Fourn., Mex. Pl. 2: 111. 1886. Bejar, Tex., *Berlandier* 1617.
- Aira mexicana* Trin. ex Fourn., Mex. Pl. 2: 111. 1886, as synonym of *Eatonia densiflora* Fourn.
- Eatonia obtusata* var. *robusta* Vasey ex L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 544. 1894. Western Texas [Wallisville, *Wallis* in 1881] to Arizona.
- Eatonia obtusata* var. *robusta* Vasey ex Rydb., U. S. Natl. Herb. Contrib. 3: 190. 1895. Mullen, Nebr., *Rydberg* 1807.
- Eatonia obtusata* var. *purpurascens* Vasey ex Rydb. and Shear, U. S. Dept. Agr., Div. Agrost. Bul. 5: 30. 1897. "Vasey in U. S. Natl. Herb." This, the type, from False Washita, Okla., *Palmer* 404; Nebraska, *Shear* 252, 252½, *Rydberg* 2002, *Kearney* 271, also cited.
- Eatonia pubescens* Scribn. and Merr., U. S. Dept. Agr., Div. Agrost. Cir. 27: 6. 1900. Starkville, Miss., *Tracy*.
- Eatonia robusta* Rydb., Torrey Bot. Club Bul. 32: 602. 1905. Based on *E. obtusata* var. *robusta* Vasey.
- Sphenopholis obtusata lobata* Scribn., Rhodora 8: 144. 1906. Based on *Trisetum lobatum* Trin.
- Sphenopholis obtusata pubescens* Scribn., Rhodora 8: 144. 1906. Based on *Eatonia pubescens* Scribn. and Merr.
- Eatonia annua* Suksdorf, West. Amer. Sci. 15: 50. 1906. Dalles on Columbia River, Oreg., *Suksdorf* 1553. [Plants depauperate, flowering first year.]
- Sphenopholis obtusata* var. *pubescens* Scribn. in Robinson, Rhodora 10: 65. 1908. Based on *Eatonia pubescens* Scribn. and Merr.
- Sphenopholis obtusata* var. *lobata* Scribn.

- in Robinson, *Rhodora* 10: 65. 1908. Based on *Trisetum lobatum* Trin.
- Sphenopholis annua* Heller, *Muhlenbergia* 6: 12. 1910. Based on *Eatonia annua* Suksdorf.
- Sphenopholis pubescens* Heller, *Muhlenbergia* 6: 12. 1910. Based on *Eatonia pubescens* Scribn. and Merr.
- Sphenopholis robusta* Heller, *Muhlenbergia* 6: 12. 1910. Based on *Eatonia obtusata* var. *robusta* Vasey.
- Reboulea obtusata* var. *lobata* Farwell, *Mich. Acad. Sci. Rpt.* 17: 182. 1916. Based on *Trisetum lobatum* Trin.
- Reboulea obtusata* var. *pubescens* Farwell, *Mich. Acad. Sci. Rpt.* 17: 181. 1916. Based on *Eatonia pubescens* Scribn. and Merr.
- Sphenopholis obtusata* var. *lobata* forma *purpurascens* Waterfall, *Rhodora* 50: 93. 1948. Based on *Eatonia obtusata* var. *purpurascens* Vasey ex Rydb. and Shear.
- (6) *Sphenopholis pallens* (Bieler) Scribn., *Rhodora* 8: 145. 1906. Based on *Aira pallens* Bieler.
- Aira pallens* Bieler, *Pl. Nov. Herb. Spreng. Cent.* 8. 1807. Pennsylvania, *Muhlenberg*.
- Aira pallens* Muhl., *Desc. Gram.* 84. 1817. No locality cited. Name only in Muhl., *Cat. Pl.* 11. 1813. *Aira pennsylvanica* Spreng., erroneously given as synonym, Muhlenberg's description agreeing with that of *A. pallens* Beiler, not with that of *A. pennsylvanica* Spreng.
- Eatonia aristata* Scribn. and Merr., *U. S. Dept. Agr., Div. Agrost. Cir.* 27: 7. 1900. South Carolina, *Curtiss* in 1875.
- Eatonia pallens* Scribn. and Merr., *U. S. Dept. Agr., Div. Agrost. Cir.* 27: 7. 1900. Based on *Aira pallens* Bieler.
- Trisetum aristatum* Nash in Small, *Fl. Southeast. U. S.* 130. 1903. Presumably based on *Eatonia aristata* Scribn. and Merr.
- Sphenopholis aristata* Heller, *Muhlenbergia* 6: 12. 1910. Based on *Eatonia aristata* Scribn. and Merr.
- Reboulea pallens* Farwell, *Mich. Acad. Sci. Rpt.* 17: 181. 1916. Based on *Aira pallens* Bieler.
- (83) **SPOROBOLUS R. Br.**
- (27) *Sporobolus airoides* (Torr.) Torr., *U. S. Rpt. Expl. Miss. Pacif.* 7: 21. 1856. Based on *Agrostis airoides* Torr.
- Agrostis airoides* Torr., *Ann. Lyc. N. Y.* 1: 151. 1824. Branches of the Arkansas River near the Rocky Mountains, *James*.
- Vilfa airoides* Trin. ex Steud., *Nom. Bot.* ed. 2. 2: 766. 1841. Based on *Agrostis airoides* Torr.
- Sporobolus diffusissimus* Buckl., *Acad. Nat. Sci. Phila. Proc.* 1862: 90. 1862. Western Texas [*Wright* 726].
- (5) *Sporobolus asper* (Michx.) Kunth, *Rév. Gram.* 1: 68. 1829. Based on *Agrostis aspera* Michx.
- Agrostis aspera* Michx., *Fl. Bor. Amer.* 1: 52. 1803. Illinois, *Michaux*.
- Agrostis composita* Poir. in Lam., *Encycl. Sup.* 1: 254. 1810. Carolina, *Bosc*.
- Vilfa aspera* Beauv., *Ess. Agrost.* 16, 147, 181. 1812. Based on *Agrostis aspera* Michx.
- Vilfa composita* Beauv., *Ess. Agrost.* 16, 147, 181. 1812. Based on *Agrostis composita* Poir.
- Agrostis involuta* Muhl., *Descr. Gram.* 72. 1817. Susquehanna, Pa., and New Jersey. Name only in Muhl., *Cat. Pl.* 11. 1813.
- Agrostis longifolia* Torr., *Fl. North. and Mid. U. S.* 1: 90. 1823. Kingsbridge, N. Y.; Hoboken, N. J.; Deerfield, Mass.; Pennsylvania, *Muhlenberg*.
- Muhlenbergia aspera* Trin. ex Kunth, *Enum. Pl.* 1: 210. 1833, as synonym of *Sporobolus asper* Kunth.
- Muhlenbergia longifolia* Trin. ex Kunth, *Enum. Pl.* 1: 229. 1833, as synonym of *Agrostis composita* Poir.
- Vilfa longifolia* Torr. in A. Gray, *N. Amer. Gram. and Cyp.* 1: 4. 1834. Based on *Agrostis longifolia* Torr.
- Sporobolus longifolius* Wood, *Class-book* ed. 1861: 775. 1861. Based on *Agrostis longifolia* Torr.
- Sporobolus compositus* Merr., *U. S. Dept. Agr., Div. Agrost. Cir.* 35: 6. 1901. Based on *Agrostis composita* Poir.
- SPOROBOLUS ASPER var. *HOOKERI* (Trin.) Vasey, *Descr. Cat. Grasses U. S.* 43. 1885. Based on *Vilfa hookeri* Trin.
- Vilfa drummondii* Trin., *Acad. St. Pétersb. Mém. VI. Sci. Nat.* 4: 106. 1840. Texas, received from Hooker and Endlicher [the type *Drummond* II. 306b].
- Vilfa hookeri* Trin., *Acad. St. Pétersb. Mém. VI. Sci. Nat.* 4: 106. 1840. Texas, received from Hooker [type *Drummond* II. 306].
- Glyceria stricta* Buckl., *Acad. Nat. Sci. Phila. Proc.* 1862: 95. 1862. Middle Texas, *Buckley*. Inflorescence abnormal, the spikelets diseased, with 2 or 3 several-nerved lemmas.
- Sporobolus drummondii* Vasey, *Grasses U. S. Descr. Cat.* 44. 1885. Based on *Vilfa drummondii* Trin.
- Sporobolus asper* var. *drummondii* Vasey, *U. S. Natl. Herb. Contrib.* 3: 60. 1892. Based on *Vilfa drummondii* Trin.
- Sporobolus attenuatus* Nash, in Small, *Fl. Southeast. U. S.* 123. 1903. Starkville, Miss., *Kearney* 83.
- SPOROBOLUS ASPER var. *PILOSUS* (Vasey) Hitchc., *Biol. Soc. Wash. Proc.* 41: 161.

1928. Based on *S. pilosus* Vasey. (Published as *S. asper pilosus*.)
Sporobolus pilosus Vasey, Bot. Gaz. 16: 26. 1891. Kansas, Smyth.
- (26) *Sporobolus buckleyi* Vasey, Torrey Bot. Club Bul. 10: 128. 1883. Texas, Buckley.
- (7) *Sporobolus clandestinus* (Bieler) Hitchc., U. S. Natl. Herb. Contrib. 12: 150. 1908. Based on *Agrostis clandestina* Beiler.
Agrostis clandestina Bieler, Pl. Nov. Herb. Spreng. Cent. 8. 1807. Pennsylvania, Muhlenberg.
Muhlenbergia clandestina Trin., Gram. Unifl. 190. 1824. Based on *Agrostis clandestina* Bieler.
Vilfa clandestina Nees ex Steud., Nom. Bot. ed. 2. 2: 767. 1841. Based on *Agrostis clandestina* Bieler.
Sporobolus canovirens Nash in Britton, Man. 1042. 1901. Tennessee to Kansas [type, St. George, Kellerman in 1890], Mississippi, and Texas.
- (24) *Sporobolus contractus* Hitchc., Amer. Jour. Bot. 2: 303. 1915. Based on *Sporobolus strictus* Merr.
Sporobolus cryptandrus var. *strictus* Scribn., Torrey Bot. Club Bul. 9: 103. 1882. Camp Lowell, Ariz., Pringle.
Sporobolus strictus Merr., U. S. Dept. Agr., Div. Agrost. Cir. 32: 6. 1901. Not *S. strictus* Franch., 1893. Based on *Sporobolus cryptandrus* var. *strictus* Scribn.
- (21) *Sporobolus cryptandrus* (Torr.) A. Gray, Man. 576. 1848. Based on *Vilfa cryptandra* Torr.
Agrostis cryptandra Torr., Ann. Lyc. N. Y. 1: 151. 1824. Canadian River [Texas or Oklahoma], James.
Vilfa tenacissima var. *fuscicola* Hook., Fl. Bor. Amer. 2: 239. 1839. Menzies Island, Columbia River, Wash.
Vilfa cryptandra Torr. ex Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 69. 1840. Based on *Agrostis cryptandra* Torr.
Vilfa triniana Steud., Syn. Pl. Glum. 1: 156. 1854. [British] Columbia.
Sporobolus cryptandrus vaginatus Lunell, Amer. Midl. Nat. 2: 123. 1911. Benson County, N. Dak., Lunell in 1911.
Sporobolus cryptandrus var. *involutus* Farwell, Mich. Acad. Sci. Rpt. 22: 179. 1921. Rochester, Mich., Farwell 5393.
- (14) *Sporobolus curtissii* (Vasey) Small ex Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 7: 142. f. 124. 1897. Based on "*S. floridanus curtissii* Vasey ex Beal."
Sporobolus curtissii Small ex Kearney, U. S. Dept. Agr., Div. Agrost. Bul. 1: 24. 1895. Description inadequate. "*Sporobolus floridanus curtissii* Vasey in herb." cited. Jacksonville, Fla., Curtiss 4053, 5181. The Curtiss speci-
- men named *Sporobolus floridanus* var. *curtissii* by Vasey is without number.
Sporobolus floridanus var. *curtissii* Vasey ex Beal, Grasses N. Amer. 2: 290. 1896. "Florida, Curtiss."
- (20) *Sporobolus domingensis* (Trin.) Kunth, Rev. Gram. 1: Sup. 17. 1830. Based on *Vilfa domingensis* Trin.
Vilfa domingensis Trin., in Spreng., Neu. Entd. 2: 59. 1821. Dominican Republic.
Agrostis domingensis Schult., Mantissa 3 (Add. 1): 570. 1827. Based on *Vilfa domingensis* Trin.
Sporobolus inordinatus Mez, Repert. Sp. Nov. Fedde 17: 294. 1921. Cuba, Ramon de la Sagra.
- (22) *Sporobolus flexuosus* (Thurb.) Rydb., Torrey Bot. Club Bul. 32: 601. 1905. Based on *Sporobolus cryptandrus* var. *flexuosus* Thurb.
Vilfa cryptandra var. *flexuosa* Thurb. ex Vasey, in Rothr., in Wheeler U. S. Survey W. 100th Merid. Rpt. 6: 282. 1878. Nevada and Arizona, Wheeler Exped.
Sporobolus cryptandrus var. *flexuosus* Thurb. in S. Wats., Bot. Calif. 2: 269. 1880. Based on *Vilfa cryptandra* var. *flexuosa* Thurb.
- (16) *Sporobolus floridanus* Chapm., Fl. South. U. S. 550. 1860. Middle and west Florida [Chapman].
- (25) *Sporobolus giganteus* Nash, Torrey Bot. Club Bul. 25: 88. 1898. Doña Ana County, N. Mex., Wooton 394.
Sporobolus cryptandrus var. *robustus* Vasey, U. S. Natl. Herb. Contrib. 1: 56. 1890. Texas, Nealley [746].
Sporobolus cryptandrus var. *giganteus* Jones, West. Bot. Contrib. 14: 11. 1912. Based on *S. giganteus* Nash.
- (12) *Sporobolus heterolepis* (A. Gray) A. Gray, Man. 576. 1848. Based on *Vilfa heterolepis* A. Gray.
Vilfa heterolepis A. Gray, Ann. Lyc. N. Y. 3: 233. 1835. Watertown, N. Y., Craze.
Agrostis heterolepis Wood, Class-book ed. 2. 598. 1847. Based on *Vilfa heterolepis* A. Gray.
- (9) *Sporobolus indicus* (L.) R. Br., Prodr. Fl. Nov. Holl. 170. 1810. Based on *Agrostis indica* L.
Agrostis indica L., Sp. Pl. 63. 1753. "India," but the type from Jamaica, sent by Patrick Browne.
Sporobolus jacquemontii Kunth, Rév. Gram. 2: 427. pl. 127. 1831. Dominican Republic.
Vilfa jacquemontii Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 92. 1840. Based on *Sporobolus jacquemontii* Kunth.
Vilfa indica Trin. ex Steud., Nom. Bot. ed. 2. 2: 767. 1841. Based on *Agrostis indica* L.

- (11) *Sporobolus interruptus* Vasey, Torrey Bot. Club Bul. 15: 8. 1888. Arizona, Coues and Palmer 66 in 1886; San Francisco Forest, Rusby 15 in 1883 [the Rusby specimen, distributed as No. 885, the type].
Sporobolus arizonicus Thurb. ex Vasey, Torrey Bot. Club Bul. 15: 8. 1888, as synonym of *Sporobolus interruptus* Vasey.
- (17) *Sporobolus junceus* (Michx.) Kunth, Rév. Gram. 1: 68. 1829. Based on *Agrostis juncea* Michx.
Agrostis juncea Michx., Fl. Bor. Amer. 1: 52. 1803. Not *A. juncea* Lam., 1783. Carolina, Michaux.
Heleochloa juncea Beauv., Ess. Agrost. 24, 147. 1812. Based on *Agrostis juncea* Michx.
Colpodium junceum Trin. in Spreng., Neu. Entd. 2: 37. 1821. Based on *Agrostis juncea* Michx.
Crypsis juncea Steud., Nom. Bot. 1: 242. 1821. Based on *Agrostis juncea* Michx.
Vilfa juncea Trin., Gram. Unifl. 157. 1824. Based on *Agrostis juncea* Michx.
Vilfa schiedeana Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 73. 1840. Arkansas, "Schiede." [Type specimen annotated by Ruprecht "Beyrich non Schiede."]
Vilfa gracilis Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 74. 1840. Carolina.
Vilfa fulvescens Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 76. 1840. North America, Bosc, Willdenow Herb. No. 1750.
Agrostis thyrsoides Bosc ex Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 76. 1840, as synonym of *Vilfa fulvescens* Trin.
Vilfa subsetacea Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 133 (in note). 1840. Based on *V. gracilis* Trin., op. cit. (page 74, not op. cit. page 104). (See synonymy under *Muhlenbergia cuspidata*.) Discovering that he had named two distinct species *Vilfa gracilis*, Trinius changed the first to *V. subsetacea*.
Vilfa vinzenti Steud., Syn. Pl. Glum. 1: 155. 1854. [Rusk County] Tex., Vincent 62.
Aira triglumis Steud., Syn. Pl. Glum. 1: 223. 1854. [Rusk County] Tex., Vincent 62.
Bennetia juncea Raf. ex Jacks., Ind. Kew. 1: 291. 1893, as synonym of *Sporobolus junceus*. Rafinesque (Bul. Bot. Seringe 1: 220. 1830) cites *Agrostis juncea* Michx., after his description of the new genus *Bennetia*, but does not transfer the specific name.
Sporobolus ejuncidus Nash in Britton, Man. 106. 1901. Based on *Sporobolus junceus* Kunth.
Sporobolus gracilis Merr., Rhodora 4: 48. 1902. Based on *Vilfa gracilis* Trin.
- (6) *Sporobolus macer* (Trin.) Hitchc., Amer. Jour. Bot. 2: 303. 1915. Based on *Vilfa macra* Trin.
Vilfa macra Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 79. 1840. Louisiana.
- (23) *Sporobolus nealleyi* Vasey, Torrey Bot. Club Bul. 15: 49. 1888, name only; U. S. Natl. Herb. Contrib. 1: 57. 1890. Brazos Santiago, Tex., Nealley.
- (4) *Sporobolus neglectus* Nash, Torrey Bot. Club Bul. 22: 464. 1895. Massachusetts to Kentucky, Tennessee, and Kansas. [Type, Woodruff Gap, N. J., Britton in 1887.]
Sporobolus vaginiflorus var. *neglectus* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 17 (ed. 2): 170. f. 466. 1901. Based on *S. neglectus* Nash.
Sporobolus ozarkanus Fernald, Rhodora 35: 109. 1933. Webb City, Mo., Palmer 3133.
- (2) *Sporobolus patens* Swallen, Wash. Acad. Sci. Jour. 31: 352. f. 5. 1941. Wilcox, Ariz., Silveus 3504.
- (8) *Sporobolus poiretii* (Roem. and Schult.) Hitchc., Bartonía 14: 32. 1932. Based on *Axonopus poiretii* Roem. and Schult. *Agrostis elongata* Lam., Tabl. Encycl. 1: 162. 1791. Not *Sporobolus elongatus* R. Br., 1810. South America.
Agrostis compressa Poir. in Lam., Encycl. Sup. 1: 258. 1810. Not *A. compressa* Willd., 1790, nor Poir. (op. cit.) 1: 259. 1810, nor *Sporobolus compressus* Kunth, 1833. Carolina, Bosc.
Milium compressum Poir. in Lam., Encycl. Sup. 1: 258. 1810. Not *M. compressum* Swartz, 1788. As synonym of *Agrostis compressa* Poir.
Vilfa elongata Beauv., Ess. Agrost. 16, 147, 181. 1812. Based on *Agrostis elongata* Lam.
Axonopus poiretii Roem. and Schult., Syst. Veg. 2: 318. 1817. Based on *Agrostis compressa* Poir., "n. 78," not *A. compressa* Willd., 1790, nor Poir. (op. cit.) No. 82, on the following page.
Sporobolus lamarckii Desv. ex Hamilt., Prodr. Pl. Ind. Occ. 4. 1825. Based on *Agrostis elongata* Lam.
Agrostis tenuissima Spreng., Syst. Veg. 1: 258. 1825. West Indies and South America.
Vilfa exilis Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 89. 1840. Jalapa, Mexico [Schiede].
Vilfa berteriana Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 100. 1840. Dominican Republic, Bernhardi.
Sporobolus angustus Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 88. 1863. "Bu-

- chanan county" [probably error for Buchanan] Tex., [Buckley].
- Vilfa tenacissima* var. *exilis* Fourn., Mex. Pl. 2: 99. 1886. Based on *Vilfa exilis* Trin.
- Sporobolus littoralis* var. *elongatus* Dur. and Schinz, Consp. Fl. Afr. 5: 821. 1894. Based on *Vilfa elongata* Beauv.
- Sporobolus berterioanus* Hitchc. and Chase, U. S. Natl. Herb. Contrib. 18: 370. 1917. Based on *Vilfa berterioana* Trin.
- This species has been included in *Sporobolus indicus* in some manuals.
- (1) *Sporobolus pulvinatus* Swallen, Wash. Acad. Sci. Jour. 31: 351. f. 4. 1941. Adamana, Ariz., Griffiths 5107.
- (18) *Sporobolus purpurascens* (Swartz) Hamilt., Prodr. Pl. Ind. Occ. 5. 1825. Based on *Agrostis purpurascens* Swartz.
- Agrostis purpurascens* Swartz, Prodr. Veg. Ind. Occ. 25. 1788. Jamaica, Swartz.
- Vilfa purpurascens* Beauv., Ess. Agrost. 16, 182. 1812. Based on *Agrostis purpurascens* Swartz.
- Vilfa grisebachiana* Fourn., Mex. Pl. 2: 98. 1886. Cuba, Wright 3427a.
- Vilfa liebmanni* Fourn., Mex. Pl. 2: 100. 1886. Mexico, Liebmann 693.
- (19) *Sporobolus pyramidatus* (Lam.) Hitchc., U. S. Dept. Agr., Misc. Pub. 243: 84. 1936. Based on *Agrostis pyramidata* Lam.
- Agrostis pyramidata* Lam., Tabl. Encycl. 1: 161. 1791. South America.
- Vilfa arguta* Nees, Agrost. Bras. 395. 1829. Brazil.
- Sporobolus argutus* Kunth, Rév. Gram. 1: Sup. 17. 1830. Based on *Vilfa arguta* Nees.
- Vilfa arkansana* Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 64. 1840. Arkansas, Beyrich.
- Vilfa subpyramidata* Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 4¹: 61. 1840. Texas [received from Hooker, the type being Drummond 377].
- Vilfa richardi* Steud., Syn. Pl. Glum. 1: 153. 1854. West Indies.
- Agrostis pyramidalis* Rich. ex Steud., Syn. Pl. Glum. 1: 153. 1854, as synonym of *Vilfa richardi* Steud.
- Vilfa agrostioidea* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 88. 1862. Llano County, Tex.
- Vilfa sabeana* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 90. 1862. San Saba County, Tex., Buckley. Given as *Vilfa* (*Sporobolus*) *sabeana*.
- Sporobolus arkansanus* Nutt. ex Vasey, U. S. Natl. Herb. Contrib. 3: 61. 1892. as synonym of *S. argutus* Kunth.
- Sporobolus sabeanus* Buckl. ex Vasey, U. S. Natl. Herb. Contrib. 3: 61. 1892, as synonym of *S. argutus* Kunth.
- (13) *Sporobolus silveanus* Swallen, Wash. Acad. Sci. Jour. 31: 350. f. 3. 1941. Orange, Tex., Silveus 6441.
- (15) *Sporobolus teretifolius* Harper, Torrey Bot. Club Bul. 33: 229. 1906. Near Moultrie, Ga., Harper 1642.
- (29) *Sporobolus texanus* Vasey, U. S. Natl. Herb. Contrib. 1: 57. 1890. Screw Bean, Presidio County, Tex., Nealley [755].
- (30) *Sporobolus tharpianus* Hitchc., Biol. Soc. Wash. Proc. 41: 161. 1928. Padre Island, Tex., Tharp 4772.
- (3) *Sporobolus vaginiflorus* (Torr.) Wood, Class-book ed. 1861. 775. 1861. Based on *Vilfa vaginiflora* Torr.
- Vilfa vaginiflora* Torr. ex Gray, N. Amer. Gram. and Cyp. 1: No. 3. 1834; Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4¹: 56. 1840. New Jersey.
- Cryptostachys vaginata* Steud., Flora 33: 229. 1850, name only; Syn. Pl. Glum. 1: 181. 1854. North America.
- Vilfa riehlia* Steud., Syn. Pl. Glum. 1: 154. 1854. North America.
- Sporobolus minor* Vasey ex A. Gray, Man. ed. 6. 646. 1890. Not *S. minor* Kunth, 1830. Virginia to North Carolina [type, Boynton], Tennessee and Texas.
- Sporobolus filiculmis* L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 519. 1894. Not *S. filiculmis* Vasey, 1885. Based on *S. minor* Vasey.
- Sporobolus ovatus* Beal, Grasses N. Amer. 2: 300. 1896. Based on *S. minor* Vasey.
- Sporobolus vaginatus* Scribn., Bot. Gaz. 21: 15. 1896. Based on *Cryptostachys vaginata* Steud.
- ?*Sporobolus vaginiflorus* var. *minor* Scribn. ex Chapm., Fl. South. U. S. ed. 3. 598. 1897. North Carolina and Tennessee.
- Sporobolus vaginiflorus* var. *inaequalis* Fernald, Rhodora 35: 109. 1933. Concord, N. H., Batchelder in 1901.
- (10) *Sporobolus virginicus* (L.) Kunth, Rév. Gram. 1: 67. 1829. Based on *Agrostis virginica* L.
- Agrostis virginica* L., Sp. Pl. 63. 1753. Virginia.
- Agrostis littoralis* Lam., Tabl. Encycl. 1: 161. 1791. South America, Richard.
- Vilfa littoralis* Beauv., Ess. Agrost. 16, 147, 181. 1812. Based on *Agrostis littoralis* Lam.
- Vilfa virginica* Beauv., Ess. Agrost. 16, 182. 1812. Based on *Agrostis virginica* L.
- Agrostis pungens* Muhl., Descr. Gram. 72. 1817. Not *A. pungens* Schreb., 1769. Eastern United States. Name only in Muhl., Cat. Pl. 11. 1813.
- Crypsis virginica* Nutt., Gen. Pl. 1: 49. 1818. Based on *Agrostis virginica* Willd. [error for L.].
- Podosaemum virginicum* Link, Hort. Berol. 1: 85. 1827. Based on *Agrostis virginica* L.

- Sporobolus littoralis* Kunth, Rév. Gram. 1: 68. 1829. Based on *Agrostis littoralis* Lam.
- (28) *Sporobolus wrightii* Munro ex Scribn., Torrey Bot. Club Bul. 9: 103. 1882. Pantano, Ariz., Pringle.
- Bauchea karwinskyi* Fourn., Mex. Pl. 2: 87. 1886. Mexico, Karwinsky 1015, 1015b.
- Sporobolus altissimus* Vasey, Calif. Acad. Sci. Proc. II. 2: 212. 1889. San Diego, Calif., Palmer [in 1888].
- Sporobolus altissimus* var. *minor* Vasey, Calif. Acad. Sci. Proc. II. 2: 213. 1889. San Enrique, Calif. [Brandegee].
- Sporobolus airoides* var. *wrightii* Gould, Madroño 10: 94. 1949. Based on *S. wrightii* Munro ex Scribn.
- (131) **STENOTAPHRUM** Trin.
- (1) *Stenotaphrum secundatum* (Walt.) Kuntze, Rev. Gen. Pl. 2: 794. 1891. Based on *Ischaemum secundatum* Walt. Kuntze misspells the specific name "secundum."
- Ischaemum secundatum* Walt., Fl. Carol. 249. 1788. South Carolina.
- Rottboellia stolonifera* Poir. in Lam., Encycl. 6: 310. 1804. Puerto Rico, Ledru.
- Stenotaphrum americanum* Schrank, Pl. Rar. Hort. Monac. pl. 98. 1822.
- Stenotaphrum sarmentosum* Nees, Agrost. Bras. 93. 1829. Based on *Rottboellia stolonifera* Poir.
- Stenotaphrum glabrum* var. *americanum* Doell in Mart., Fl. Bras. 2²: 300. 1877. Based on *Stenotaphrum americanum* Schrank.
- Stenotaphrum dimidiatum* var. *americanum* Hack. in Stuck., An. Mus. Nac. Buenos Aires 21: 57. 1911. Based on *Stenotaphrum americanum* Schrank.
- Stenotaphrum dimidiatum* var. *secundum* [secundatum] Domin, Bibl. Bot. 85: 332. 1915. Based on *Ischaemum secundatum* Walt.
- Stenotaphrum secundatum* var. *variegatum* Hitchc. in Bailey, Stand. Cycl. Hort. 6: 3237. 1917. Greenhouse plant.
- (91) **STIPA** L.
- (33) *Stipa arida* Jones, Calif. Acad. Sci. Proc. II. 5: 725. 1895. Marysville, Utah, Jones 5377.
- Stipa mormonum* Mez, Repert. Sp. Nov. Fedde 17: 209. 1921. Utah, Jones [2106].
- (8) *Stipa avenacea* L., Sp. Pl. 78. 1753. Virginia.
- Stipa barbata* Michx., Fl. Bor. Amer. 1: 53. 1803. Not *S. barbata* Desf. 1798. Virginia and Carolina, Michaux.
- Stipa virginica* Pers., Syn. Pl. 1: 99. 1805. Based on *S. barbata* Michx.
- Stipa diffusa* Willd. ex Steud., Nom. Bot. ed. 2. 2: 643. 1841, as synonym of *Stipa avenacea* L.
- Stipa avenacea* var. *bicolor* Eaton and Wright, N. Amer. Bot. ed. 8. 444. 1848. Philadelphia and Chester, Pa.; Boston, Mass.; Ontario; Florida.
- Podopogon avenaceus* Raf. ex Jacks., Ind. Kew. 2: 580. 1894, as synonym of *Stipa avenacea*.
- Podopogon barbatus* Raf. ex Jacks., Ind. Kew. 2: 580. 1894, as synonym of *Stipa avenacea*.
- Piptochaetium avenaceus* Parodi, Rev. Mus. La Plata Bot. n. ser. 6: 223, 229. f. 1. B. 1944. Based on *Stipa avenacea* L.
- (7) *Stipa avenacioides* Nash, Torrey Bot. Club Bul. 22: 423. 1895. Cassia, Lake County, Fla., Nash 2051.
- Stipa brachychaeta* Godr., Mem. Acad. Monsp. (Sec. Medic.) 1: 450. 1853. Originally described from specimens from unknown source. Native of southern South America.
- (22) *Stipa californica* Merr. and Davy, Calif. Univ. Pubs., Bot. 1: 61. 1902. San Jacinto Mountains, Calif., Hall 2556.
- (12) *Stipa cernua* Stebbins and Love, Madroño 6: 137. f. 1. 2. 1941. Alameda County, Calif., Stebbins 2732.
- Stipa pulchra* var. *cernua* Beetle and Tofsrud, West. Bot. Leaflets 5: 35. 1947. Based on *S. cernua* Stebbins and Love.
- (28) *Stipa columbiana* Macoun, Can. Pl. Cat. 2⁴: 191. 1888. Yale, British Columbia, Macoun [28,940]; Victoria, Vancouver Island, Macoun [28,941].
- Stipa viridula* var. *minor* Vasey, U. S. Natl. Herb. Contrib. 3: 50. 1892. [Kelso Mountain, Colo., Letterman 95.]
- Stipa minor* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 11: 46. 1898. Based on *S. viridula* var. *minor* Vasey.
- STIPA COLUMBIANA** var. **NELSONI** (Scribn.) Hitchc., U. S. Natl. Herb. Contrib. 24: 254. 1925. Based on *S. nelsoni* Scribn. (Published as *S. columbiana nelsoni*.)
- Stipa columbiana* var. *nelsoni* St. John, Fl. Southeast. Wash. and Adj. Idaho 61. 1937. Same basis.
- Stipa occidentalis* [Thurb.; misapplied by] Boland., Calif. Acad. Sci. Proc. 4: 169. 1872. Larger plant with "awns almost entirely smooth," confused with true *S. occidentalis*.
- Stipa nelsoni* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 11: 46. 1898. Albany County, Wyo., A. Nelson 3963.
- (10) *Stipa comata* Trin. and Rupr., Acad. St. Pétersb. Mém. VI. Sci. Nat. 5¹: 75. 1842. Carlton House Fort, Saskatchewan River, Drummond; Columbia River, near Missouri Portage, Douglas.
- Stipa comata* subsp. *intonsa* Piper, U. S. Natl. Herb. Contrib. 11: 109. 1906. Rockland, Klickitat County, Wash., Suksdorf 1026.

- Stipa comata* var. *suksdorfii* St. John, Fl. Southeast. Wash. and Adj. Idaho 61. 1937. Spokane County, Wash., *Suksdorf* 8990.
- This is the species described by Pursh (Fl. Amer. Sept. 1: 72. 1814), and Nuttall (Gen. Pl. 1: 58. 1818) under *Stipa juncea* L., and by Hooker (Fl. Bor. Amer. 2: 257. 1840) under *S. capillata* L.
- STIPA COMATA var. INTERMEDIA Scribn. and Tweedy, Bot. Gaz. 11: 171. 1886. Junction Butte, Yellowstone Park, *Tweedy* 610.
- Stipa tweedyi* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 11: 47. 1898. Based on *S. comata* var. *intermedia* Scribn. and Tweedy.
- Stipa spartea* var. *tweedyi* Jones, West Bot. Contrib. 14: 11. 1912. Based on *S. tweedyi* Scribn.
- (5) *Stipa coronata* Thurb. in S. Wats., Bot. Calif. 2: 287. 1880. California, Julian, *Bolander*; San Bernardino, *Parry* and *Lemmon* 422.
- STIPA CORONATA var. DEPAUPERATA (Jones) Hitchc., Jour. Wash. Acad. Sci. 24: 292. 1934. Based on *S. parishii* var. *depau-perata* Jones.
- Stipa parishii* Vasey, Bot. Gaz. 7: 33. 1882. San Bernardino Mountains, Calif., *Parish* 1079.
- Stipa parishii* var. *depauperata* Jones, West. Bot. Contrib. 14: 11. 1912. Detroit, Utah [*Jones*].
- Stipa coronata parishii* Hitchc., U. S. Natl. Herb. Contrib. 24: 227. 1925. Based on *S. parishii* Vasey.
- (23) *Stipa curvifolia* Swallen, Wash. Acad. Sci. Jour. 23: 456. 1933. Guadalupe Mountains, N. Mex., *Wilkins* 1660.
- (31) *Stipa diegoensis* Swallen, Wash. Acad. Sci. Jour. 30: 212. f. 2. 1940. San Diego County, Calif., *Gander* 5778.
- Stipa elegantissima* Labill., Nov. Holl. Pl. 1: 23. pl. 29. 1804. Australia.
- (18) *Stipa elmeri* Piper and Brodie ex Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 11: 46. 1898. Based on *S. viridula* var. *pubescens* Vasey.
- Stipa viridula* var. *pubescens* Vasey, U. S. Natl. Herb. Contrib. 3: 50. 1892. Not *S. pubescens* R. Br., 1810. Washington, *Suksdorf*.
- (14) *Stipa eminens* Cav., Icon. Pl. 5: 42. pl. 467. f. 1. 1799. Chalma, Mexico.
- Stipa erecta* Fourn., Mex. Pl. 2: 75. 1886. Not *S. erecta* Trin., 1824. Tehuacan, Mexico, *Liebmann* 654.
- Stipa flexuosa* Vasey, Torrey Bot. Club Bul. 15: 49. 1888. Western Texas [Chenete Mountains], *Nealley*.
- (19) *Stipa latiglumis* Swallen, Wash. Acad. Sci. Jour. 23: 198. f. 1. 1933. Camp Lost Arrow, Yosemite Valley, Calif., *Abrams* 4469.
- (25) *Stipa lemmoni* (Vasey) Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 30: 3.
1901. Based on *S. pringlei* var. *lemmoni* Vasey.
- Stipa pringlei* var. *lemmoni* Vasey, U. S. Natl. Herb. Contrib. 3: 55. 1892. Plumas County, Calif., *Lemmon* [5456].
- Stipa lemmoni* var. *jonesii* Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 30: 4. 1901. Emigrant Gap, Calif., *Jones* 3298.
- (15) *Stipa lepida* Hitchc., Amer. Jour. Bot. 2: 302. 1915. Santa Ynez Forest, Calif., *Chase* 5611.
- STIPA LEPIDA var. ANDERSONII (Vasey) Hitchc., Amer. Jour. Bot. 2: 303. 1915. Based on *S. eminens* var. *andersonii* Vasey. (Published as *S. lepida andersonii*.)
- Stipa eminens* var. *andersonii* Vasey, U. S. Natl. Herb. Contrib. 3: 54. 1892. California [Santa Cruz, *Anderson* 58, type]. "Lower California," cited by Vasey is erroneous.
- Stipa hassei* Vasey, U. S. Natl. Herb. Contrib. 1: 267. 1893. Santa Monica, Calif., *Hasse*. Abnormal specimen, the spikelets distorted by a smut.
- (29) *Stipa lettermani* Vasey, Torrey Bot. Club Bul. 13: 53. 1886. Snake River, Idaho, *Letterman* [102].
- Stipa viridula* var. *lettermani* Vasey, U. S. Natl. Herb. Contrib. 3: 50. 1892. Presumably based on *S. lettermani* Vasey.
- (3) *Stipa leucotricha* Trin. and Rupr., Acad. St. Pétersb. Mém., VI. Sci. Nat. 5¹: 54. 1842. Texas, from Hooker.
- Stipa ciliata* Scheele, Linnaea 22: 342. 1849. New Braunfels, Tex., *Römer*.
- (21) *Stipa lobata* Swallen, Wash. Acad. Sci. Jour. 23: 199. f. 2. 1933. Ranger Station. Queen, Guadalupe Mountains, N. Mex., *Hitchcock* (*Amer. Gr. Natl. Herb.* 819).
- Stipa neesiana* Trin. and Rupr., Acad. St., Pétersb. Mém. VI. Sci. Nat. 5¹: 27. 1842. Montevideo, *Sellow*.
- (1) *Stipa neomexicana* (Thurb.) Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 17: 132. f. 428. 1899. Based on *S. pennata* var. *neo-mexicana* Thurb.
- Stipa pennata* var. *neo-mexicana* Thurb. in Coulter, Man. Rocky Mount. 408. 1885. New Mexico [type Rio Mimbres, *Thurber* 269], Colorado, and Texas.
- (20) *Stipa occidentalis* Thurb. in S. Wats., in King, Geol. Expl. 40th Par. 5: 380. 1871. Yosemite Trail, Calif., *Bolander* 5038.
- Stipa stricta* Vasey, Torrey Bot. Club Bul. 10: 42. 1883. Not *S. stricta* Lam. 1791. Washington (erroneously cited as Oregon), *Suksdorf*.
- Stipa stricta* var. *sparsiflora* Vasey, U. S. Natl. Herb. Contrib. 3: 51. 1892. Yosemite Trail, Calif., *Bolander* 5038.
- Stipa oregonensis* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 17: 130. f. 426. 1899. Based on *S. stricta* Vasey.
- Stipa occidentalis montana* Merr. and Davy, Calif. Univ. Pubs., Bot. 1: 62.

1902. Yosemite Trail, *Bolander* 5038.
- Stipa pennata* L., Sp. Pl. 78. 1753. Europe.
- (32) *Stipa pinetorum* Jones, Calif. Acad. Sci. Proc. II. 5: 724. 1895. Panguitch Lake, Utah, *Jones* 6023 p.
- (16) *Stipa porteri* Rydb., Torrey Bot. Club Bul. 32: 599. 1905. Based on the plant described as *S. mongolica* Turcz. by Porter and Coulter (Syn. Fl. Colo. 145. 1874). [Rocky Mountains, *Hall* and *Harbour* 648, error for 646.]
- This is the species described under the name *Oryzopsis mongolica* (Turcz.) Beal (Bot. Gaz. 15: 111. 1890), but that name is based on *Stipa mongolica* Turcz., an Asiatic species.
- (13) *Stipa pringlei* Scribn. in Vasey, U. S. Natl. Herb. Contrib. 3: 54. 1892. Mexico, *Pringle* [1410 type], and Arizona, *Pringle*, *Lemmon*, *Tracy*. No reference to *Oryzopsis pringlei* Beal.
- Oryzopsis pringlei* Beal, Bot. Gaz. 15: 112. 1890. Chihuahua, Mexico, *Pringle* 1410.
- Stipa pringlei* Scribn. ex Beal, Bot. Gaz. 15: 112. 1890, as synonym of *Oryzopsis pringlei* Beal.
- Oryzopsis erecta* Beal, Grasses N. Amer. 2: 230. 1896. Apparently based on *O. pringlei* Beal, *Pringle* 1410 being cited, the name changed because of *O. pringlei* Scribn. ex Beal 1896 (page 226 of the same work). The latter is the same as *Stipa virescens* H. B. K. of Mexico, not known from the United States. Beal erroneously gives the authority of *O. erecta* as "(Scribn.) Beal."
- Piptochaetium pringlei* Parodi, Rev. Mus. La Plata Bot. (n. s.) 6: 223, 230. f. 1, D. 1944. Based on *Oryzopsis pringlei* Beal.
- (11) *Stipa pulchra* Hitchc., Amer. Jour. Bot. 2: 301. 1915. Healdsburg, Sonoma County, Calif., *Heller* 5252.
- (6) *Stipa richardsoni* Link, Hort. Berol. 2: 245. 1833. Western North America. Grown at Berlin from seed sent by Richardson.
- Stipa richardsoni* var. *major* Macoun, Can. Pl. Cat. 24: 191. 1888, without description. Columbia Valley, British Columbia, *Macoun*.
- Oryzopsis richardsoni* Beal, Bot. Gaz. 15: 111. 1890. Based on *Stipa richardsoni* Link, but misapplied to *Oryzopsis canadensis*.
- (27) *Stipa robusta* (Vasey) Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 5: 23. 1897. Based on *S. viridula* var. *robusta* Vasey. Not invalidated by *S. robusta* Nutt. ex Trin. and Rupr., published as synonym of *S. spartea*.
- Stipa viridula* var. *robusta* Vasey, U. S. Natl. Herb. Contrib. 1: 56. 1890. Presidio County, Tex., *Nealley* [714].
- Stipa vaseyi* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 11: 46. 1898. Based on *S. viridula* var. *robusta* Vasey.
- (24) *Stipa scribneri* Vasey, Torrey Bot. Club Bul. 11: 125. 1884. Santa Fe, N. Mex. [*Vasey*].
- (9) *Stipa spartea* Trin., Acad. St. Pétersb. Mém. VI. Math. Phys. Nat. 1: 82. 1830. North America [Rocky Mountains near the Missouri]. By typographical error the name is spelled "sparta."
- Stipa robusta* Nutt. ex Trin. and Rupr., Acad. St. Pétersb. Mém. VI. Sci. Nat. 5¹: 69. 1842, as synonym of *S. spartea*.
- STIPA SPARTEA var. CURTISETA Hitchc., U. S. Natl. Herb. Contrib. 24: 230. 1925. Hound Creek Valley, Mont., *Scribner* 339. (Published as *S. spartea curtiseta*.)
- (2) *Stipa speciosa* Trin. and Rupr., Acad. St. Pétersb. Mém. VI. Sci. Nat. 5¹: 45. 1842. Chile, *Cuming*.
- Stipa californica* Vasey, Amer. Acad. Proc. 24: 80. 1889. Name only for Palmer's No. 505 in 1887 from Los Angeles Bay, Baja California.
- Stipa speciosa* var. *minor* Vasey, U. S. Natl. Herb. Contrib. 3: 52. 1892. Empire City, Nev., *Jones*.
- Stipa humilis* var. *jonesiana* Kuntze, Rev. Gen. Pl. 3²: 371. 1898. Empire City, Nev., *Jones* 4111.
- Stipa humilis* var. *speciosa* Kuntze, Rev. Gen. Pl. 3²: 371. 1898. Based on *S. speciosa* Trin. and Rupr.
- Stipa splendens* Trin. in Spreng., Neu. Entd. 2: 54. 1821. Siberia.
- (4) *Stipa stillmanii* Boland., Calif. Acad. Sci. Proc. 4: 169. 1872. Blue Canyon, Sierra Nevada, Calif., *Bolander*.
- Stipa tenacissima* L., Cent. Pl. 1: 6. 1755; Amoen. Acad. 4: 266. 1759. Spain.
- (34) *Stipa tenuissima* Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 2¹: 36. 1836. Mendoza "Chile," [Argentina], *Gillies*.
- Stipa cirrosa* Fourn., Mex. Pl. 2: 75. 1886. Mexico, *Karwinsky* 1009.
- Stipa subulata* Fourn., Mex. Pl. 2: 75. 1886. Mexico, *Karwinsky* 1009b.
- (17) *Stipa thurberiana* Piper, U. S. Dept. Agr., Div. Agrost. Cir. 27: 10. 1900. Washington, north branch of the Columbia and Okanagan, *Pickering* and *Brackenridge*.
- Stipa occidentalis* Thurb. in Wilkes, U. S. Expl. Exped. Bot. 17: 483. 1874. Not *S. occidentalis* Thurb. in S. Wats., 1871. North Branch of the Columbia River [Washington, *Pickering* and *Brackenridge*].
- (26) *Stipa viridula* Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 2¹: 39. 1836. North America [Saskatchewan].
- Stipa parviflora* [Desf., misapplied by] Nuttall, Gen. Pl. 1: 59. 1818. Plains of the Missouri.
- Stipa nuttalliana* Steud., Nom. Bot. ed. 2. 2: 643. 1841. Based on *Stipa parviflora* as described by Nuttall.

Stipa sparta Trin. ex Hook., Fl. Bor. Amer. 2: 237. 1840. Name only, *S. parviflora* Nutt., not Desf., cited as synonym.

- (30) *Stipa williamsii* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 11: 45. 1898. Big Horn Mountain, Wyo., *Williams* 2804.

THEMEDA Forsk.

Themeda quadrivalvis (L.) Kuntze, Rev. Gen. Pl. 2: 794. 1891. Based on *Andropogon quadrivalvis* L.

Andropogon quadrivalvis L., Syst. Veg. ed. 13. 758. 1774. India.

Anthistiria ciliata L. f., Sup. 113. 1781. Based on *Andropogon quadrivalvis* L.

Themeda ciliata Hack. in DC., Monogr. Phan. 6: 664. 1889. Based on *Anthistiria ciliata* L. f.

Thysanolaena maxima (Roxb.) Kuntze, Rev. Gen. Pl. 2: 794. 1891. Based on *Agrostis maxima* Roxb.

Agrostis maxima Roxb., Fl. Ind. 1: 319. 1820. India.

Thysanolaena agrostis Nees, Edinburgh New Phil. Jour. 18: 180. 1835. Based on *Agrostis maxima* Roxb.

(160) TRACHYPOGON Nees

- (1) *Trachypogon secundus* (Presl) Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 32: 1. 1901. Based on *Heteropogon secundus* Presl.

Heteropogon secundus Presl, Rel. Haenk. 1: 355. 1830. Mexico, *Haenke*.

Andropogon secundus Kunth, Rév. Gram. 1: Sup. 39. 1830. Not *A. secundus* Ell., 1821. Based on *Heteropogon secundus* Presl.

Trachypogon preslii var. *secundus* Anderss., Öfvers. Svensk. Vetensk. Akad. Förhandl. 14: 50. 1857. Based on *Heteropogon secundus* Presl.

Trachypogon plumosus var. *montufari* subvar. *secundus* Hack. ex Henr., Med. Rijks Herb. Leiden 40: 40. 1921. Based on *Heteropogon secundus* Presl.

Included in *Trachypogon montufari* (H. B. K.) Nees in Manual ed. 1. That species has not been found north of Mexico.

(93) TRAGUS Hall.

- (1) *Tragus berteronianus* Schult., Mantissa 2: 205. 1824. Dominican Republic, *Bertero*.

Tragus occidentalis Nees, Agrost. Bras. 286. 1829. Brazil.

Lappago berteroniana Schult. ex Steud., Syn. Pl. Glum. 1: 112. 1854, erroneously cited as synonym of *L. aliena* Spreng.

Tragus racemosus var. *brevispicula* Doell in Mart., Fl. Bras. 2^a: 123. pl. 18. 1877. Brazil.

Nazia occidentalis Scribn., Zoe 4: 386. 1894. Based on *Tragus occidentalis* Nees.

Lappago occidentalis Nees ex Hook. f., Fl. Brit. Ind. 7: 97. 1896. Presumably based on *Tragus occidentalis* Nees; erroneously cited as synonym of *Tragus racemosus* All.

The following two names refer to *Tragus berteronianus*, though they are based on *Lappago alienus* Spreng., which is *Pseudechinolaena polystachya* (H. B. K.) Stapf, of the Tropics.

Nazia racemosa aliena Scribn. and Smith, U. S. Dept. Agr., Div. Agrost. Bul. 4: 12. 1897. Based on *Lappago aliena* Spreng.

Nazia aliena Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 17: 28. f. 324. 1899. Based on *Lappago aliena* Spreng.

- (2) *Tragus racemosus* (L.) All., Fl. Pedem. 2: 241. 1785. Based on *Cenchrus racemosus* L.

Cenchrus racemosus L., Sp. Pl. 1049. 1753. Southern Europe.

Lappago racemosa Honck., Syn. Pl. Germ. 1: 440. 1792. Based on *Cenchrus racemosus* L.

Tragus muricatus Moench, Meth. Pl. 53. 1794. Based on *Cenchrus racemosus* L.

Tragus racemosus var. *longispicula* Doell, in Mart., Fl. Bras. 2^a: 122. 1877. Based on *T. racemosus* Desf. (Same as *T. racemosus* All.)

Nazia racemosa Kuntze, Rev. Gen. Pl. 2: 780. 1891. Based on *Cenchrus racemosus* L.

(128) TRICHACHNE Nees

- (2) *Trichachne californica* (Benth.) Chase, Wash. Acad. Sci. Jour. 23: 455. 1933. Based on *Panicum californicum* Benth.

Panicum californicum Benth., Bot. Voy. Sulph. 55. 1840. Bay of Magdalena, Baja California.

Panicum lachnanthum Torr., U. S. Expl. Miss. Pacif. Rpt. 7^a: 21. 1858. Not *P. lachnanthum* Hochst., 1855. Burro Mountains, N. Mex.

Panicum saccharatum Buckl., Prel. Rpt. Geol. Agr. Survey Tex. App. 2. 1866. Texas, *Buckley*.

Panicum insulare var. *lachnanthum* Kuntze, Rev. Gen. Pl. 3^a: 361. 362. 1898. Based on *P. lachnanthum* Torr.

Trichachne saccharata Nash in Small, Fl. Southeast. U. S. 83. 1903. Based on *Panicum saccharatum* Buckl.

Valota saccharata Chase, Biol. Soc. Wash. Proc. 19: 188. 1906. Based on *Panicum saccharatum* Buckl.

Digitaria californica Henr., Blumea 1: 99. 1934. Based on *Panicum californicum* Benth.

- (4) *Trichachne hitchcockii* (Chase) Chase, Wash. Acad. Sci. Jour. 23: 454. 1933. Based on *Valota hitchcockii* Chase.

- Valota hitchcockii* Chase, Biol. Soc. Wash. Proc. 24: 110. 1911. San Antonio, Tex., *Hitchcock* 5329.
- Digitaria hitchcockii* Stuck., Ann. Cons. Jard. Genève 17: 287. 1914. Based on *Valota hitchcockii* Chase.
- (1) *Trichachne insularis* (L.) Nees, Agrost. Bras. 86. 1829. Based on *Andropogon insularis* L.
- Andropogon insularis* L., Syst. Nat. ed. 10. 2: 1304. 1759. Jamaica, *Sloane*.
- Panicum lanatum* Rottb., Act. Lit. Univ. Hafn. 1: 269. 1778. Dutch Guiana.
- Milium villosum* Swartz, Prodr. Veg. Ind. Occ. 24. 1788. Based on *Andropogon insularis* L.
- Milium hirsutum* Beauv., Ess. Agrost. 13. pl. 5. f. 5. 1812. No locality cited.
- Panicum leucophaeum* H. B. K., Nov. Gen. et Sp. 1: 97. 1815. Venezuela and Colombia, *Humboldt* and *Bonpland*.
- Panicum insulare* G. Meyer, Prim. Fl. Esseq. 60. 1818. Based on *Andropogon insularis* L.
- Saccharum polystachyum* Sieb. ex Kunth, Enum. Pl. 1: 124. 1833. Not *S. polystachyum* Swartz, 1788. As synonym of *Panicum leucophaeum* H. B. K.
- Agrostis villosa* Poir ex Steud., Nom., Bot. ed. 2. 1: 43. 1840. Not *A. villosa* Poir., 1786. As synonym of *Milium villosum* Swartz.
- Panicum saccharoides* A. Rich. in Sagra, Hist. Cuba 11: 306. 1850. Not *P. saccharoides* Trin., 1826. Cuba.
- Panicum falsum* Steud., Syn. Pl. Glum. 1: 67. 1854. Cuba.
- Panicum duchaissingii* Steud., Syn. Pl. Glum. 1: 93. 1854. Guadeloupe, *Duchaissing*.
- Tricholaena insularis* Griseb., Abhandl. Gesell. Wiss. Göttingen 7: 265. 1857. Based on *Andropogon insularis* L.
- Digitaria leucophaea* Stapf in Dyer, Fl. Cap. 7: 382. 1898. Based on *Panicum leucophaeum* Swartz (error for H. B. K.)
- Panicum insulare* var. *leucophaeum* Kuntze, Rev. Gen. Pl. 3^o: 361, 362. 1898. Based on *P. leucophaeum* H. B. K.
- Syntherisma insularis* Millsp. and Chase, Field Mus. Bot. 1: 473. 1902. Based on *Andropogon insularis* L.
- Valota insularis* Chase, Biol. Soc. Wash. Proc. 19: 188. 1906. Based on *Andropogon insularis* L.
- Digitaria insularis* Mez ex Ekman, Arkiv Bot. 13: 22. 1913. Based on *Andropogon insularis* L.
- Andropogon fabricii* Herzog ex Henr., Med. Rijks Herb. Leiden 40: 44. 1921. Jamaica, *Swartz*. (Sterile specimen with large galls.)
- (3) *Trichachne patens* Swallen, Amer. Jour. Bot. 19: 442. f. 5. 1932. Near Lake Mitchell, San Antonio, Tex., *Amer. Gr. Natl. Herb.* 294 (*Hitchcock* 5328).
- Digitaria patens* Henr., Blumea 1: 99. 1934. Based on *Trichachne patens* Swallen.

(111) TRICHLORIS Fourn.

- (1) *Trichloris crinita* (Lag.) Parodi, Rev. Argentina Agron. 14: 63. 1947. Based on *Chloris crinita* Lag.
- Chloris crinita* Lag., Var. Cienc. 4: 143. 1805. Erroneously said to come from Philippine Islands (collected by Née), but the type in the Madrid Herbarium and the brief description agree with *Trichloris mendocina*. Née collected grasses in both Mexico and Argentina.
- Chloris mendocina* R. A. Phil., An. Univ. Chile 36: 208. 1870. Mendoza, Argentina [Philippi].
- Trichloris blanchardiana* Fourn. ex Scribn., Torrey Bot. Club Bul. 9: 146. 1882. Tucson, Ariz., *Pringle*.
- Chloridiopsis* [error for *Chloropsis*] *blanchardiana* Gay ex Scribn., Torrey Bot. Club Bul. 9: 146. 1882, as synonym of *Trichloris blanchardiana* Fourn.
- Trichloris verticillata* Fourn. ex Vasey, Grasses U. S. Descr. Cat. 61. 1885, name only; U. S. Dept. Agr., Div. Bot. Bul. 12^o: pl. 25. 1891. Arizona [Tucson, *Pringle*].
- Trichloris fasciculata* Fourn., Mex. Pl. 2: 142. 1886. San Luis de Potosí, Mexico, *Viret* 1440.
- Chloropsis fasciculata* Kuntze, Rev. Gen. Pl. 2: 771. 1891. Based on *Trichloris fasciculata* Fourn.
- Chloropsis blanchardiana* Kuntze, Rev. Gen. Pl. 2: 771. 1891. Based on *Trichloris blanchardiana* Hack. (error for Fourn.).
- Chloropsis crinita* Kuntze, Rev. Gen. Pl. 2: 771. 1891. Based on *Chloris crinita* Lag.
- Leptochloris crinita* Munro ex Kuntze, Rev. Gen. Pl. 2: 771. 1891. Name in Kew Herbarium.
- Trichloris mendocina* Kurtz, Mem. Fac. Cienc. Exact. Univ. Córdoba 1896: 37. 1897. Based on *Chloris mendocina* R. A. Phil.
- Chloropsis mendocina* Kuntze, Rev. Gen. Pl. 3^o: 348. 1898. Based on *Chloris mendocina* R. A. Phil.
- Trichloris mendocina* forma *blanchardiana* Kurtz, Bol. Acad. Cienc. Córdoba 16: 270. 1900. Based on *T. blanchardiana* Fourn.
- Leptochloris greggii* Munro ex Merrill, U. S. Dept. Agr., Div. Agrost. Cir. 32: 7. 1901, as synonym of *Chloropsis mendocina* Kuntze.
- Chloris trichodes* Lag. ex Parodi, Rev. Argentina Agron. 14: 62. 1947, as synonym of *Trichloris crinita* (Lag.) Parodi.
- Trichloris crinita* var. *typica* Parodi, Rev. Argentina Agron. 14: 63. 1947.
- (2) *Trichloris pluriflora* Fourn., Mex. Pl. 2:

142. 1886. Mexico, *Karwinsky*; Texas, between Laredo and Bejar [Bexar], *Berlandier* 1430.

Trichloris latifolia Vasey, U. S. Dept. Agr. Spec. Rpt. 63: 32. 1883. Texas and New Mexico [Wright 763]. Name only.

Chloropsis pluriflora Kuntze, Rev. Gen. Pl. 2: 771. 1891. Based on *Trichloris pluriflora* Fourn.

(98) **TRICHONEURA** Anderss.

(1) *Trichoneura elegans* Swallen, Amer. Jour. Bot. 19: 439. f. 4. 1932. Devine, Tex., *Silveus* 343.

(33) **TRIDENS** Roem. and Schult.

(15) *Tridens albescens* (Vasey) Woot. and Standl., N. Mex. Col. Agr. Bul. 81: 129. 1912. Based on *Triodia albescens* Vasey.

Triodia albescens Vasey, U. S. Dept. Agr., Div. Bot. Bul. 12²: pl. 33. 1891. Texas [type, *Hall* 782] and New Mexico.

Tricuspsis albescens Munro erroneously cited as synonym (see this name under *T. congestus*).

Sieglingia albescens Kuntze, Rev. Gen. Pl. 2: 789. 1891. Based on *Triodia albescens* Vasey.

Rhombolytrum albescens Nash in Britton, Man. 129. 1901. Based on *Triodia albescens* Vasey.

(8) *Tridens ambiguus* (Ell.) Schult., Mantissa 2: 333. 1824. Based on *Poa ambigua* Ell.

Poa ambigua Ell., Bot. S. C. and Ga. 1: 165. 1816. South Carolina and Georgia.

Windsoria ambigua Nutt., Gen. Pl. 1: 70. 1818. Based on *Poa ambigua* Ell.

Uralespis ambigua Kunth, Rév. Gram. 1: 108. 1829. Based on *Poa ambigua* Ell.

Tricuspsis ambigua Chapm., Fl. South. U. S. 559. 1860. Based on *Poa ambigua* Ell.

Triodia ambigua Benth. ex Vasey, U. S. Dept. Agr. Spec. Rpt. 63: 35. 1883. Not *T. ambigua* R. Br., 1810. Based on *Tricuspsis ambigua* Chapm.

Sieglingia ambigua Kuntze, Rev. Gen. Pl. 2: 789. 1891. Based on *Poa ambigua* Ell.

Tricuspsis langloisii Nash, N. Y. Bot. Gard. Bul. 1: 293. 1899. Louisiana, *Langlois*.

Triodia elliotii Bush, Acad. Sci. St. Louis, Trans. 12: 73. 1902. Based on *Poa ambigua* Ell.

Triodia langloisii Bush, Acad. Sci. St. Louis, Trans. 12: 72. 1902. Based on *Tricuspsis langloisii* Nash.

Tridens langloisii Nash in Small, Fl. Southeast. U. S. 142. 1903. Based on *Tricuspsis langloisii* Nash.

(6) *Tridens buckleyanus* (L. H. Dewey) Nash in Small, Fl. Southeast. U. S. 143. 1903. Based on *Sieglingia buckleyana* L. H. Dewey.

Sieglingia buckleyana L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 540. 1894. Southern Texas, *Buckley*.

Triodia buckleyana Vasey, U. S. Natl. Herb. Contrib. 2: 540. 1894, as synonym of *Sieglingia buckleyana* L. H. Dewey.

Triodia buckleyana Vasey ex Hitchc., Wash. Acad. Sci. Jour. 23: 452. 1933. Based on *Sieglingia buckleyana* L. H. Dewey.

(7) *Tridens carolinianus* (Steud.) Henr., Blumea 3: 424. 1940. Based on *Festuca caroliniana* Steud.

Festuca caroliniana Steud., Syn. Pl. Glum. 1: 312. 1854. Carolina, *Bosc*.

Triodia drummondii Scribn. and Kearn., U. S. Dept. Agr., Div. Agrost. Bul. 4: 37. 1897. Jacksonville, "Fla." [Louisiana], *Drummond*.

Tridens drummondii Nash ex Small, Fl. Southeast. U. S. 143. 1903. Based on *Triodia drummondii* Scribn. and Kearn.

Triodia caroliniana Chase, Amer. Jour. Bot. 24: 34. 1937. Based on *Festuca caroliniana* Steud.

(12) *Tridens chapmani* (Small) Chase, new combination. Based on *Sieglingia chapmani* Small.

Sieglingia chapmani Small, Torrey Bot. Club Bul. 22: 365. 1895. Florida, *Chapman*.

Triodia chapmani Bush, Acad. Sci. St. Louis, Trans. 12: 74. 1902. Based on *Sieglingia chapmani* Small.

Triodia flava var. *chapmani* Fern. and Griseb., Rhodora 37: 133. 1935. Based on *Sieglingia chapmani* Small.

(5) *Tridens congestus* (L. H. Dewey) Nash in Small, Fl. Southeast. U. S. 143. 1903. Based on *Sieglingia congesta* L. H. Dewey.

Tricuspsis albescens Munro ex A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 335. 1863. Name only for *Drummond* 314, Texas.

Sieglingia congesta L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 538. 1894. Corpus Christi, Tex., *Nealley* 24.

Tricuspsis congesta Heller, N. Amer. Pl. Cat. ed. 2. 28. 1900. Based on "*Triodia*" [error for *Sieglingia*] *congesta* L. H. Dewey.

Triodia congesta Bush, Acad. Sci. St. Louis, Trans. 12: 67. pl. 10. 1902. Based on *Sieglingia congesta* L. H. Dewey.

(17) *Tridens elongatus* (Buckl.) Nash in Small, Fl. Southeast. U. S. 143. 1903. Based on *Uralespis elongata* Buckl.

Uralespis elongata Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 89. 1862. Northern Texas.

Triodia trinerviglumis Benth. ex Vasey, U. S. Dept. Agr. Spec. Rpt. 63: 35. 1883, name only, with *Tricuspsis trinerviglumis* Munro, also name only, as

- synonym. Texas. Described in Vasey, U. S. Dept. Agr., Div. Bot. Bul. 12: pl. 40. 1891. Texas to Arizona, northward to Colorado.
- Tricuspis trinerviglumis* Munro ex Vasey, U. S. Dept. Agr., Spec. Rpt. 63: 35. 1883, as synonym of *Triodia trinerviglumis* Benth.
- Sieglingia trinerviglumis* Kuntze, Rev. Gen. Pl. 2: 789. 1891. Based on *Tricuspis trinerviglumis* "Buckl." (error for Munro).
- Sieglingia elongata* Nash in Britt. and Brown, Illustr. Fl. 3: 504. 1898. Based on *Uralepis elongata* Buckl.
- Tricuspis elongata* Heller, Cat. N. Amer. Pl. ed. 2. 28. 1900. Based on "*Triodia*" [error for *Uralepis*] *elongata* Buckl.
- Triodia elongata* Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 17 (ed. 2): 210. f. 506. 1901. Based on *Uralepis elongata* Buckl.
- (9) *Tridens eragrostoides* (Vasey and Scribn.) Nash in Small, Fl. Southeast. U. S. 142. 1903. Based on *Triodia eragrostoides* Vasey and Scribn.
- Triodia eragrostoides* Vasey and Scribn., U. S. Natl. Herb. Contrib. 1: 58. 1890. Texas, *Nealley*.
- Sieglingia eragrostoides* L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 539. 1894. Based on *Triodia eragrostoides* Vasey and Scribn.
- Sieglingia eragrostoides* var. *scabra* Vasey ex Beal, Grasses N. Amer. 2: 465. 1896. Texas, *Nealley* [probably No. 96].
- Triodia eragrostoides* var. *scabra* Bush, Acad. Sci. St. Louis, Trans. 12: 71. 1902. Based on *Sieglingia eragrostoides* var. *scabra* Vasey.
- (10) *Tridens flavus* (L.) Hitchc., Rhodora 8: 210. 1906. Based on *Poa flava* L.
- Poa flava* L., Sp. Pl. 68. 1753. Virginia.
- Poa sesleroides* Michx., Fl. Bor. Amer. 1: 68. 1803. Not *P. sesleroides* All., 1785. Illinois and the mountains of Carolina [type], *Michaux*.
- Tricuspis caroliniana* Beauv., Ess. Agrost. 179. pl. 3. f. 29, pl. 15. f. 10. 1812. South Carolina.
- Tricuspis novae-boracensis* Beauv., Ess. Agrost. 77, 179. 1812. Name only. New York, *Delille*.
- Poa caeruleascens* Michx. ex Beauv., Ess. Agrost. 77. 1812, name only; Kunth, Rév. Gram. 1: 108. 1829, as synonym of *Uralepis cuprea* Kunth.
- Festuca quadridens* Poir. in Lam., Encycl. Sup. 2: 640. 1812. Carolina, *Bosc*.
- Triodia cuprea* Jacq., Eclog. Gram. 2: 21. pl. 16. 1814. Grown in botanic garden, source unknown.
- Poa quinquefida* Pursh, Fl. Amer. Sept. 1: 81. 1814. New England to Carolina.
- ?*Panicum festucoides* Poir. in Lam., Encycl. Sup. 4: 283. 1816. East Indies, *Desvaux*, but *Desvaux* later (see *Triodia festucoides* below) corrects this to North America.
- Poa arundinacea* Poir. in Lam., Encycl. Sup. 4: 329. 1816. Based on *P. sesleroides* Michx.
- Tridens quinquefidus* Roem. and Schult., Syst. Veg. 2: 599. 1817. Based on *Poa quinquefida* Pursh.
- Windsoria poaeformis* Nutt., Gen. Pl. 1: 70. 1818. Based on *Poa sesleroides* Michx.
- Tricuspis sesleroides* Torr., Fl. North. and Mid. U. S. 118. 1823. Based on *Poa sesleroides* Michx.
- Cynodon carolinianus* Raspail, Ann. Sci. Nat., Bot. 5: 302. 1825. Based on *Tricuspis caroliniana* Beauv.
- Windsoria sesleroides* Eaton, Man. ed. 5. 447. 1829. Based on *Poa sesleroides* Michx.
- Uralepis cuprea* Kunth, Rév. Gram. 1: 108. 1829. Based on *Triodia cuprea* Jacq.
- Eragrostis tricuspis* Trin., Acad. St. Pétersb. Mém. VI. Math. Phys. Nat. 1: 414. 1830. Based on *Tricuspis caroliniana* Beauv.
- Tricuspis quinquefida* Beauv. ex Don, Loud. Hort. Brit. 31. 1830. Based on *Poa caeruleascens* Michx.
- ?*Triodia festucoides* Desv., Opusc. 98. 1831. North America, *Panicum festucoides* Desv., in Poir., cited as synonym.
- Triodia caeruleascens* Desv., Opusc. 99. 1831. Based on *Poa caeruleascens* Michx.
- Triodia novaeboracensis* Desv., Opusc. 99. 1831. Based on *Tricuspis novaeboracensis* Beauv.
- Uralepis tricuspis* Steud., Nom. Bot. ed. 2. 1: 564. 1840. Based on *Eragrostis tricuspis* Trin.
- Festuca purpurea* Schreb. ex Steud., Nom. Bot. ed. 2. 1: 632. 1840, as synonym of *Uralepis cuprea* Kunth.
- Tricuspis sesleroides* var. *flexuosa* Wood, Amer. Bot. and Flor. pt. 2: 398. 1871. Pennsylvania.
- Festuca flava* F. Muell., Sel. Pl. Indus. Cult. 87. 1876. Based on *Poa flava* "Gronov" [L.].
- Triodia sesleroides* Benth. ex Vasey, U. S. Dept. Agr. Spec. Rpt. 63: 35. 1883. Based on *Tricuspis sesleroides* Torr.
- Sieglingia flava* Kuntze, Rev. Gen. Pl. 2: 789. 1891. Based on *Poa flava* L.
- Sieglingia cuprea* Millsp., Fl. W. Va. 471. 1892. Presumably based on *Triodia cuprea* Jacq.
- Sieglingia sesleroides* Scribn., Torrey Bot. Club Mem. 5: 48. 1894. Based on *Poa sesleroides* Michx.
- Sieglingia sesleroides* var. *intermedia* Vasey ex L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 539. 1894. Texas to Oklahoma, *Sheldon* in 1891.
- Triodia sesleroides* var. *aristata* Scribn.

- and Ball, U. S. Dept. Agr., Div. Agrost. Bul. 24: 45. 1901. Clarcona, Fla., Meislahn 90.
- Tricuspsis seslerioides* var. *pallida* Holm, Biol. Soc. Wash. Proc. 14: 19. 1901. Marshall Hall, Md., Holm.
- Tridens seslerioides* Nash in Small, Fl. Southeast. U. S. 142. 1903. Based on *Poa seslerioides* Michx.
- Tricuspsis flava* Hubb., Rhodora 14: 186. 1912. Based on *Poa flava* L.
- Eragrostis arundinacea* Jedw., Bot. Archiv Mez 5: 192. 1924. Texas.
- Tridens flava* Smyth, Kans. Acad. Trans. 25: 95. 1913. Based on *Poa flava* L.
- Triodia flava* var. *aristata* Fern. and Grise., Rhodora 37: 134. 1935. Based on *Triodia seslerioides* var. *aristata* Scribn. and Ball.
- Triodia flava* forma *flava* Fosberg, Castanea 11: 66. 1946. Based on *Poa flava* L.
- Triodia flava* forma *cuprea* Fosberg, Castanea 11: 67. 1946. Based on *Triodia cuprea* Jacq.
- (2) ***Tridens grandiflorus*** (Vasey) Woot. and Standl., N. Mex. Col. Agr. Bul. 81: 129. 1912. Based on *Triodia grandiflora* Vasey.
- Uralepis avenacea* var. *viridiflora* Fourn., Mex. Pl. 2: 110. 1886. San Luis de Potosí, Virlet 1379. No description, but specimen cited is *Tridens grandiflorus*.
- Triodia grandiflora* Vasey, U. S. Natl. Herb. Contrib. 1: 59. 1890. Chenate Mountains, Presidio County, Tex., Nealley 823.
- Sieglingia avenacea* var. *grandiflora* L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 538. 1894. Based on *Triodia grandiflora* Vasey.
- Sieglingia grandiflora* Beal, Grasses N. Amer. 2: 471. 1896. Based on *Triodia grandiflora* Vasey.
- (16) ***Tridens muticus*** (Torr.) Nash in Small, Fl. Southeast. U. S. 143. 1903. Based on *Tricuspsis mutica* Torr.
- Tricuspsis mutica* Torr., U. S. Expl. Miss. Pacif. Rpt. 4: 156. 1857. Laguna Colorado, N. Mex. [Bigelow].
- Uralepis pilosa* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 95. 1862. Not *U. pilosa* Buckl., op. cit. 94. "Northern Texas" cited, but the type is from western Texas, collected by Wright.
- Triodia mutica* Scribn., Torrey Bot. Club Bul. 10: 30. 1883. Based on *Tricuspsis mutica* Torr.
- Uralepis mutica* Fourn. ex Hemsl., Biol. Centr. Amer. Bot. 3: 569. 1885, as synonym of *Triodia mutica* Benth. (*U. mutica* Fourn., Mex. Pl. 2: 110. 1886, based on Liebmann 611, is *Poa alpina*.)
- Sieglingia mutica* Kuntze, Rev. Gen. Pl. 2: 789. 1891. Based on *Tricuspsis mutica* Torr.
- (3) ***Tridens nealleyi*** (Vasey) Woot. and Standl., N. Mex. Col. Agr. Bul. 81: 129. 1912. Based on *Triodia nealleyi* Vasey.
- Triodia nealleyi* Vasey, Torrey Bot. Club Bul. 15: 49. 1888, name only; U. S. Dept. Agr., Div. Bot. Bul. 122: pl. 36. 1891. Western Texas, Nealley.
- Sieglingia nealleyi* L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 538. 1894. Based on *Triodia nealleyi* Vasey.
- Tricuspsis nealleyi* Heller, N. Amer. Pl. Cat. ed. 2. 28. 1900. Presumably based on *Triodia nealleyi* Vasey.
- (11) ***Tridens oklahomensis*** (Feath.) Feath., new combination. Based on *Triodia oklahomensis* Feath.
- Triodia oklahomensis* Feath., Rhodora 40: 243. 1938. Stillwater, Okla., Wade in 1937.
- (4) ***Tridens pilosus*** (Buckl.) Hitchc., U. S. Natl. Herb. Contrib. 17: 357. 1913. Based on *Uralepis pilosa* Buckl.
- Uralepis pilosa* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 94. 1862. Middle Texas, [Buckley].
- Tricuspsis acuminata* Munro ex A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 335. 1862, as synonym of *Uralepis pilosa* Buckl.
- Triodia acuminata* Benth. ex Vasey, U. S. Dept. Agr. Spec. Rpt. 63: 35. 1883, name only, with *Tricuspsis acuminata* Munro given as synonym; Vasey, U. S. Dept. Agr., Div. Bot. Bul. 122: pl. 32. 1891. Texas [type, Austin, Hall 779] to Arizona and Mexico.
- Sieglingia acuminata* Kuntze, Rev. Gen. Pl. 2: 789. 1891. Based on *Triodia acuminata* Vasey.
- Sieglingia pilosa* Nash in Britt. and Brown, Illustr. Fl. 3: 504. 1898. Based on *Uralepis pilosa* Buckl.
- Tricuspsis pilosa* Heller, Cat. N. Amer. Pl. ed. 2: 28. 1900. Presumably based on *Uralepis pilosa* Buckl.
- Triodia pilosa* (Buckl.) Merr., U. S. Dept. Agr., Div. Agrost. Cir. 32: 9. 1901. Based on *Uralepis pilosa* Buckl.
- Erioneuron pilosum* Nash in Small, Fl. Southeast. U. S. 144. 1903. Based on *Uralepis pilosa* Buckl.
- (1) ***Tridens pulchellus*** (H. B. K.) Hitchc. in Jepson, Fl. Calif. 1: 141. 1912. Based on *Triodia pulchella* H. B. K.
- Triodia pulchella* H. B. K., Nov. Gen. et Sp. 1: 155. pl. 47. 1816. Mexico, Humboldt and Bonpland.
- Koeleria pulchella* Spreng., Syst. Veg. 1: 332. 1825. Based on *Triodia pulchella* H. B. K.
- Uralepis pulchella* Kunth, Rév. Gram. 1: 108. 1829. Based on *Triodia pulchella* H. B. K.
- Dasyochloa pulchella* Willd. ex Steud., Nom. Bot. ed. 2. 1: 484. 1840, as synonym of *Uralepis pulchella* Kunth ex

- Rydb., Fl. Rocky Mount. 67. 1917. Based on *Triodia pulchella* H. B. K.
- Tricuspis pulchella* Torr., U. S. Expl. Miss. Pacif. Rpt. 4: 156. 1857. Based on "*Trichodia*" [error for *Triodia*] *pulchella* H. B. K.
- Trichodictida prolifera* Cervant., *Naturalista* 1870: 346. 1870. Near Mexico City.
- Sieglingia pulchella* Kuntze, *Rev. Gen. Pl.* 2: 789. 1891. Based on *Triodia pulchella* H. B. K.
- Sieglingia pulchella* var. *parviflora* Vasey ex Beal, *Grasses N. Amer.* 2: 468. 1896. Southern California, *Orcutt*.
- (14) *Tridens strictus* (Nutt.) Nash in Small, *Fl. Southeast. U. S.* 143. 1903. Based on *Windsoria stricta* Nutt.
- Windsoria stricta* Nutt., *Amer. Phil. Soc. Trans. (n. s.)* 5: 147. 1837. Arkansas (probably Arkansas Post), *Nuttall*.
- Tricuspis stricta* Wood, *Class-book*, ed. 1861. 792. 1861. Based on *Windsoria stricta* Nutt.
- Uralespis densiflora* Buckl., *Acad. Nat. Sci. Phila. Proc.* 1862: 94. 1862. Middle Texas, [*Buckley*].
- Triodia stricta* Benth. ex Vasey, *U. S. Dept. Agr. Spec. Rpt.* 63: 35. 1883. Based on "*Tricuspis*" [error for *Windsoria*] *stricta* Nutt.
- Sieglingia stricta* Kuntze, *Rev. Gen. Pl.* 2: 789. 1891. Based on *Windsoria stricta* Nutt.
- (13) *Tridens texanus* (S. Wats.) Nash in Small, *Fl. Southeast. U. S.* 142. 1903. Based on *Triodia texana* Thurb. (error for S. Wats.).
- Triodia texana* S. Wats., *Amer. Acad. Sci. Proc.* 18: 180. 1883. Coahuila, Mexico; western Texas and New Mexico, *Wright* 776, 777, and 2045 [error for 2055], type, from Texas.
- Tricuspis texana* Thurb. ex S. Wats., *Amer. Acad. Sci. Proc.* 18: 180. 1883, as synonym of *Triodia texana* S. Wats.
- Sieglingia texana* Kuntze, *Rev. Gen. Pl.* 2: 789. 1891. Based on *Triodia texana* S. Wats.
- (34) **TRIPLASIS Beauv.**
- (2) *Triplasis americana* Beauv., *Ess. Agrost.* 81. pl. 16. f. 10. 1812. United States, *Delille*.
- Uralespis cornuta* Ell., *Bot. S. C. and Ga.* 1: 580. 1821, South Carolina and Georgia.
- Tricuspis cornuta* A. Gray, *Man.* 590. 1848. Based on *Uralespis cornuta* Ell.
- Triplasis cornuta* Benth. ex Jacks., *Ind. Kew.* 2: 1121. 1895, as synonym of *Triplasis americana* Beauv.
- Sieglingia americana* Beal, *Grasses N. Amer.* 2: 466. 1896. Based on *Triplasis americana* Beauv.
- (1) *Triplasis purpurea* (Walt.) Chapm., *Fl. South. U. S.* 560. 1860. Based on *Aira purpurea* Walt.
- Aira purpurea* Walt., *Fl. Carol.* 78. 1788. South Carolina.
- Festuca brevifolia* Muhl., *Descr. Gram.* 167. 1817. Delaware, Georgia, and New York. Name only, Muhl., *Cat. Pl.* 13. 1813.
- Diplocea barbata* Raf., *Amer. Jour. Sci.* 1: 252. 1818. Carolina; Long Island.
- Uralespis purpurea* Nutt., *Gen. Pl.* 1: 62. 1818. Based on *Aira purpurea* Walt.
- Uralespis aristulata* Nutt., *Gen. Pl.* 1: 63. 1818. Wilmington, Del., *Baldwin*.
- Glyceria?* *brevifolia* Schult., *Mantissa* 2: 387. 1824. Based on *Festuca brevifolia* Muhl.
- Tricuspis purpurea* A. Gray, *Man.* 589. 1848. Based on *Aira purpurea* Walt.
- Merisachne drummondii* Steud., *Syn. Pl. Glum.* 1: 117. 1854. Texas, *Drummond* 330.
- Festuca purpurea* F. Muell., *Sel. Pl. Indus. Cult.* 88. 1876. Based on *Uralespis purpurea* Nutt.
- Triplasis sparsiflora* Chapm., *Bot. Gaz.* 3: 19. 1878. Punta Rassa, Fla., [*Chapman*, specimen affected by fungus.]
- Sieglingia purpurea* Kuntze, *Rev. Gen. Pl.* 2: 789. 1891. Based on *Aira purpurea* Walt.
- Panicularia brevifolia* Porter, *Torrey Bot. Club Bul.* 20: 205. 1893. Based on *Festuca brevifolia* Muhl.
- Triplasis intermedia* Nash, *Torrey Bot. Club Bul.* 25: 564. 1898. Tampa, Fla., *Nash* 2426.
- Triplasis floridana* Gandog., *Soc. Bot. France Bul.* 667: 303. 1920. Punta Rassa, Fla., *Hitchcock* 533.
- Triplasis glabra* Gandog., *Soc. Bot. France Bul.* 667: 303. 1920. Rhode Island and Florida.
- Triodia purpurea* Smyth, *Kans. Acad. Sci. Trans.* 25: 95. 1913. Based on *Triplasis purpurea* Chapm.
- (99) **TRIPOGON Roth**
- (1) *Tripogon spicatus* (Nees) Ekman, *Arkiv Bot.* 114: 36. 1912. Based on *Bromus spicatus* Nees.
- Bromus spicatus* Nees, *Agrost. Bras.* 471. 1829. Piauhy, Brazil.
- Diplachne spicata* Doell in Mart., *Fl. Bras.* 23: 159. pl. 28. f. 2. 1878. Based on *Bromus spicatus* Nees.
- Triodia schaffneri* S. Wats., *Amer. Acad. Sci. Proc.* 18: 181. 1883. San Luis Potosí, Mexico, *Schaffner* 1077.
- Diplachne reverchonii* Vasey, *Torrey Bot. Club Bul.* 13: 118. 1886. Llano County, Tex., *Reverchon*.
- Leptochloa spicata* Scribn., *Acad. Nat. Sci. Phila. Proc.* 1891: 304. 1891. Based on *Diplachne spicata* Doell.
- Sieglingia schaffneri* Kuntze, *Rev. Gen. Pl.* 2: 789. 1891. Based on *Triodia schaffneri* S. Wats.

Rabdochloa spicata Kuntze ex Stuck., An. Mus. Nac. Buenos Aires 11: 121. 1904. Based on *Bromus spicatus* Nees.
Sieglingia spicata Kuntze ex Stuck., An. Mus. Nac. Buenos Aires 11: 128. 1904. Based on *Bromus spicatus* Nees.

(166) TRIPSACUM L.

- (1) *Tripsacum dactyloides* (L.) L., Syst. Nat. ed. 10. 2: 1261. 1759. Based on *Coix dactyloides* L.
Coix dactyloides L., Sp. Pl. 972. 1753. America.
Coix angulatis Mill., Gard. Dict. ed. 8. Coix No. 2. 1768. North America.
Ischaemum glabrum Walt., Fl. Carol. 249. 1788. South Carolina.
Tripsacum monostachyum Willd., Sp. Pl. 4: 202. 1805. South Carolina.
Tripsacum dactyloides var. *monostachyon* Eaton and Wright, N. Amer. Bot. ed. 8. 461. 1840. Connecticut. Wood, Class-book 453. 1845. Gray, Man. Bot. 616. 1848. No basis given.
Tripsacum dactyloides var. *monostachyum* Hack. in Mart., Fl. Bras. 2³: 316. 1883. Based on *T. monostachyum* Willd.
Dactylodes angulatum Kuntze, Rev. Gen. Pl. 2: 773. 1891. Based on *Coix angulatis* Mill.
Dactylodes dactylodes Kuntze, Rev. Gen. Pl. 3²: 349. 1898. Based on *Tripsacum dactyloides* L.
Tripsacum dactyloides var. *occidentale* Cutler and Anders., Mo. Bot. Gard. Ann. 28: 258. 1941. Jeff Davis County, Tex., Moore and Steyermark 3092.
(2) *Tripsacum floridanum* Porter ex Vasey, U. S. Natl. Herb. Contrib. 3: 6. 1892. Florida, Garber.
Tripsacum dactyloides var. *floridanum* Beal, Grasses N. Amer. 2: 19. 1896. Based on *T. floridanum* Porter.
(3) *Tripsacum lanceolatum* Rupr. in Fourn., Mex. Pl. 2: 68. 1886. Aguas Calientes, Mexico, Hartweg 252.
Tripsacum acutiflorum Fourn., Soc. Bot. Belg. Bul. 15: 466. 1876, name only; Nash, N. Amer. Fl. 17: 81. 1909. Same type as *T. lanceolatum* Rupr.
Tripsacum lemmoni Vasey, U. S. Natl. Herb. Contrib. 3: 6. 1892. Huachuca Mountains, Ariz., Lemmon [2932].
Tripsacum dactyloides var. *lemmoni* Beal, Grasses N. Amer. 2: 19. 1896. Based on *T. lemmoni* Vasey.
Tripsacum dactyloides hispidum Hitchc., Bot. Gaz. 41: 295. 1906. Las Canoas, Mexico, Pringle 3811.

(57) TRisetum Pers.

Trisetum aureum (Ten.) Ten., Fl. Napol. 2: 378. 1820. Based on *Koeleria aurea* Ten.
Koeleria aurea Ten., Cors. Bot. Lez. 1: 58. 1806. Europe.

- (6) *Trisetum canescens* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 100. 1862. Columbia Plains, Oreg., Nuttall.
Trisetum elatum Nutt. ex A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 337. 1862, as synonym of *T. canescens* Buckl.
Trisetum cernuum var. *canescens* Beal, Grasses N. Amer. 2: 380. 1896. Based on *T. canescens* Buckl.
Trisetum canescens forma *tonsum* Louis-Marie, Rhodora 30: 216. 1928. Trinity County, Calif., Yates 522.
Trisetum canescens forma *velutinum* Louis-Marie, Rhodora 30: 216. 1928. Lassens Peak, Calif., Austin in 1879.
Trisetum projectum Louis-Marie, Rhodora 30: 217. 1928. Fresno County, Calif., Hall and Chandler 359.
Trisetum cernuum var. *projectum* Beetle, West. Bot. Leaflets 4: 288. 1946. Based on *T. projectum* Louis-Marie.
(4) *Trisetum cernuum* Trin., Acad. St. Pétersb. Mém. VI. Math. Phys. Nat. 1: 61. 1830. Sitka, Alaska.
Avena nutkaensis Presl, Rel. Haenk. 1: 254. 1830. Nootka Sound, Vancouver Island, Haenke.
Avena cernua Kunth, Rév. Gram. 1: Sup. 26. 1830. Based on *Trisetum cernuum* Trin.
Trisetum sandbergii Beal, Grasses N. Amer. 2: 378. 1896. Mount Stuart, Wash., Sandberg and Leiberger 823.
Trisetum nutkaense Scribn. and Merr. ex Davy, Calif. Univ. Pubs., Bot. 1: 63. 1902. Based on *Avena nutkaensis* Presl.
Trisetum cernuum var. *luxurians* Louis-Marie, Rhodora 30: 213. 1928. Sea-side, Oreg., Shear and Scribner 1705.
Trisetum cernuum var. *luxurians* forma *pubescens* Louis-Marie, Rhodora 30: 213. 1928. Eureka, Calif.
Trisetum cernuum var. *sandbergii* Louis-Marie, Rhodora 30: 214. 1928. Based on *T. sandbergii* Beal.
Trisetum cernuum forma *pubescens* G. N. Jones, Wash. Univ. Pubs. Biol. 5: 108. 1936. Based on *T. cernuum* var. *luxurians* forma *pubescens* Louis-Marie.
(8) *Trisetum flavescens* (L.) Beauv., Ess. Agrost. 88, 153. pl. 18. f. 1. 1812. Based on *Avena flavescens* L.
Avena flavescens L., Sp. Pl. 80. 1753. Europe.
Trisetum pratense Pers., Syn. Pl. 1: 97. 1805. Europe.
Trisetaria flavescens Baumg., Enum. Stirp. Transsilv. 3: 263. 1816. Based on *Avena flavescens* Schreb. (error for L.).
Rebentischia flavescens Opiz, Lotos 4: 104. 1854, as synonym of *Trisetum flavescens* Beauv.
(10) *Trisetum interruptum* Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 100. 1862. Middle Texas [Buckley].
? *Calamagrostis longirostris* Buckl., Prel. Rpt. Geol. Agr. Survey Tex. App. 2.

1866. Texas.
Trisetum hallii Scribn., Torrey Bot. Club Bul. 11: 6. 1884. Texas, *Hall* 799 in part.
Sphenopholis interrupta Scribn., Rhodora 8: 145. 1906. Based on *Trisetum interruptum* Buckl.
Sphenopholis hallii Scribn., Rhodora 8: 146. 1906. Based on *Trisetum hallii* Scribn.
Trisetum interruptum hallii Hitchc., Biol. Soc. Wash. Proc. 41: 160. 1928. Based on *T. hallii* Scribn.
- (1) ***Trisetum melicoides*** (Michx.) Scribn., Bot. Gaz. 9: 169. 1884. Based on *Aira melicoides* Michx.
Aira melicoides Michx., Fl. Bor. Amer. 1: 62. 1803. Canada.
? *Arundo airoides* Poir. in Lam., Encycl. 6: 270. 1804. North America, *Michaux*.
Graphephorum melicoideum Desv., Nouv. Bul. Soc. Philom. Paris 2: 189. 1810. Based on *Aira melicoides* Michx.
? *Deyeuxia airoides* Beauv., Ess. Agrost. 44, 152, 160. 1812. Based on *Arundo airoides* Michx. [error for Poir.].
Poa melicoides Nutt., Gen. Pl. 1: 68. 1818. Based on *Aira melicoides* Michx.
Triodia melicoides Spreng., Syst. Veg. 1: 331. 1825. Based on *Aira melicoides* Michx.
? *Agrostis airoides* Raspail, Ann. Sci. Nat., Bot. 5: 449. 1825. Based on *Deyeuxia airoides* Beauv.
? *Calamagrostis airoides* Steud., Nom. Bot. ed. 2. 1: 249. 1840. Based on *Arundo airoides* Poir.
Dupontia cooleyi A. Gray, Man. ed. 2. 556. 1856. Washington, Mich. [Cooley].
Graphephorum melicoides var. *major* A. Gray, Amer. Acad. Sci. Proc. 5: 191. 1861. Based on *Dupontia cooleyi* A. Gray.
Graphephorum melicoideum cooleyi Scribn., Torrey Bot. Club Mem. 5: 53. 1894. Based on *Dupontia cooleyi* A. Gray.
Trisetum melicoideum cooleyi Scribn., Rhodora 8: 87. 1906. Based on *Dupontia cooleyi* A. Gray.
Trisetum melicoides var. *majus* Hitchc. in Robinson, Rhodora 10: 65. 1908. Based on *Graphephorum melicoides* var. *major* A. Gray.
Graphephorum cooleyi Farwell, Mich. Acad. Sci. Papers 1: 88. 1921. Based on *Dupontia cooleyi* A. Gray.
- (7) ***Trisetum montanum*** Vasey, Torrey Bot. Club Bul. 13: 118. 1886. No locality cited. [Type, Las Vegas, N. Mex., *G. R. Vasey* in 1881.]
Trisetum argenteum Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 11: 49. f. 8. 1898. Not *T. argenteum* Roem. and Schult., 1817. Silverton, Colo., *Shear* 1214.
Trisetum shearii Scribn., U. S. Dept. Agr., Div. Agrost. Cir. 30: 8. 1901. Based on *T. argenteum* Scribn.
Graphephorum shearii Rydb., Torrey Bot. Club Bul. 32: 602. 1905. Based on *Trisetum shearii* Scribn.
Trisetum canescens var. *montanum* Hitchc., Biol. Soc. Wash. Proc. 41: 160. 1928. Based on *T. montanum* Vasey.
Trisetum montanum var. *pilosum* Louis-Marie, Rhodora 30: 212. 1928. Caroles, N. Mex., *Standley* 4536.
Trisetum montanum var. *shearii* Louis-Marie, Rhodora 30: 213. 1928. Based on *Trisetum shearii* Scribn.
- (3) ***Trisetum orthochaetum*** Hitchc., Amer. Jour. Bot. 21: 134. f. 3. 1934. Lolo Hot Springs, Bitterroot Mountains, Mont., *Chase* 5129.
- (9) ***Trisetum pennsylvanicum*** (L.) Beauv. ex Roem. and Schult., Syst. Veg. 2: 658. 1817. Based on *Avena pennsylvanica* L.
Avena pennsylvanica L., Sp. Pl. 79. 1753. Pennsylvania, *Kalm*.
? *Avena caroliniana* Walt., Fl. Carol. 81. 1788. South Carolina.
Avena palustris Michx., Fl. Bor. Amer. 1: 72. 1803. Carolina and Georgia, *Michaux*.
Aira pallens var. *aristata* Muhl. ex Ell., Bot. S. C. and Ga. 1: 151. 1816. South Carolina.
Avena pennsylvanica Muhl., Deser. Gram. 185. 1817. Pennsylvania and North Carolina. No authority cited but the Muhlenberg specimen belongs to the Linnaean species.
Trisetum palustre Torr., Fl. North. and Mid. U. S. 126. 1823. Based on *Avena palustris* Michx.
Arrhenatherum pennsylvanicum Torr., Fl. North. and Mid. U. S. 1: 130. 1823. Based on *Avena pennsylvanica* L.
Arrhenatherum kentuckensis Torr., Fl. North. and Mid. U. S. 1: 131. 1823. Kentucky, sent by Rafinesque.
The name was spelled "*Kentuckenensis*" in Eaton, Man. Bot. N. Amer. ed. 5. 115. 1829, and *A. kentuckiensis* in Eaton and Wright, N. Amer. Bot. ed. 8. 136. 1840, both credited to Torrey.
Trisetum ludovicianum Vasey, Torrey Bot. Club Bul. 12: 6. 1885. Pointe à la Hache, La., *Langlois*.
Sphenopholis palustris Scribn., Rhodora 8: 145. 1906. Based on *Avena palustris* Michx.
Sphenopholis palustris flexuosa Scribn., Rhodora 8: 143, 145. 1906. Wilmington, Del., *Commons* 274.
Sphenopholis palustris var. *flexuosa* Scribn. in Robinson, Rhodora 10: 65. 1908. Based on *S. palustris flexuosa* Scribn.
Sphenopholis pennsylvanica Hitchc., Amer. Jour. Bot. 2: 304. 1915. Based on *Avena pennsylvanica* L.
Sphenopholis pennsylvanica var. *flexuosa* Hubb., Rhodora 18: 234. 1916. Based

on *S. palustris flexuosa* Scribn.

The plant from Hunting Creek, Va., discussed by Vasey (Bot. Gaz. 9: 165. 1884) as a hybrid between *Trisetum palustre* and *Eatonia pennsylvanica*, is an exceptional specimen of *Trisetum pennsylvanicum* (L.) Beauv. with short-awned and awnless spikelets.

(5) *Trisetum spicatum* (L.) Richt., Pl. Eur. 1: 59. 1890. Based on *Aira spicata* L.

Aira spicata L., Sp. Pl. 64. 1753. Lapland.

Aira subspicata L., Syst. Nat. ed. 10. 2: 873. 1759. Based on *A. spicata* L.

(Sp. Pl. 64. 1753), the diagnosis copied.

Avena airoides Koel., Descr. Gram. 298. 1802. Based on *Aira subspicata* L.

Avena mollis Michx., Fl. Bor. Amer. 1: 72. 1803. Canada. Not *Avena mollis* Salisb., 1796, nor Koel., 1802.

Avena subspicata Clairv., Man. Herbor. 17. 1811. Based on a phrase name in Haller which refers to *Aira spicata* L.

Trisetum subspicatum Beauv., Ess. Agrost. 88, 149. 1812. Based on *Aira subspicata* L.

Melica triflora Bigel., New England Jour. Med. and Surg. 5: 334. 1816. Mount Washington, N. H., Boott. (In Eaton, Man. ed. 2. 317. 1818, misspelled *Melica triflora* and placed under the genus *Melica*, preceding *Melica*.)

Trisetaria airoides Baumg., Enum. Stirp. Transsilv. 3: 265. 1816. Based on *Avena airoides* Koel.

Trisetum airoides Beauv. ex Roem. and Schult., Syst. Veg. 2: 666. 1817. Based on *Avena airoides* Koel.

Trisetum molle Kunth, Rév. Gram. 1: 101. 1829. Based on *Avena mollis* Michx.

Koeleria subspicata Reichenb., Fl. Germ. 49. 1830. Based on *Aira subspicata* L.

Koeleria canescens Torr. ex Trin., Acad. St. Pétersb. Mém. VI. Sci. Nat. 2¹: 13. 1836, as synonym of *Trisetum molle* Kunth.

Trisetum subspicatum var. *molle* A. Gray, Man. ed. 2. 572. 1856. Based on *Avena mollis* Michx.

Koeleria spicata Reichenb. ex. Willk. and Lange, Prodr. Fl. Hisp. 1: 72. 1861. as synonym of *Trisetum subspicatum* Beauv.

Rupestolina pubescens Provancher, Fl. Canad. 689. 1862. Based on *Avena mollis* Michx.

Trisetum spicatum var. *molle* Beal, Grasses N. Amer. 2: 377. 1896. Based on *Avena mollis* Michx.

Trisetum brittonii Nash, N. Y. Bot. Gard. Bul. 1: 437. 1900. Marquette, Mich., Britton in 1883.

Trisetum congdoni Scribn. and Merr., Torrey Bot. Club Bul. 29: 470. 1902. Mariposa County, Calif., Congdon.

Trisetum americanum Gandog., Soc. Bot. France Bul. 49: 182. 1902. Colorado;

Idaho.

Trisetum majus Rydb., Colo. Agr. Expt. Sta. Bul. 100: 34. 1906. "*T. subspicatum* major Vasey," an unpublished name, cited as basis. A tall specimen collected by Vasey, Pen Gulch, Colo., in 1884 and marked "var. major Vasey" in his script is taken as type. No description by Rydberg except the distinctions given in the key.

Avena spicata Fedtsch., Act. Hort. Petrop. 28: 76. 1908. Not *A. spicata* L. Based on *Aira spicata* L.

Trisetum spicatum var. *pilosiglume* Fernald, Rhodora 18: 195. 1916. Newfoundland, Fernald, Wiegand, and Bartram 4593.

Trisetum spicatum var. *congdoni* Hitchc., Biol. Soc. Wash. Proc. 41: 160. 1928. Based on *Trisetum congdoni* Scribn. and Merr.

Trisetum spicatum var. *brittonii* Louis-Marie, Rhodora 30: 239. 1929. Based on *T. brittonii* Nash.

Trisetum spicatum var. *michauxii* St. John, Fl. Southeast. Wash. and Adj. Idaho 62. 1937. Based on *Avena mollis* Michx., not *A. mollis* Salisb., 1796, nor Koel., 1802.

(2) *Trisetum wolffii* Vasey, U. S. Dept. Agr. Monthly Rpt. Feb. Mar. 156. 1874. Twin Lakes, Colo., Wolf.

Trisetum subspicatum var. *muticum* Boland. in S. Wats., Bot. Calif. 2: 296. 1880. Upper Tuolumne, Calif., Bolander 5019.

Trisetum brandegei Scribn., Torrey Bot. Club Bul. 10: 64. 1883. Cascade Mountains, Brandegee and Tweedy in 1882.

Graphephorum wolffii Vasey ex Coult., Man. Rocky Mount. 423. 1885. Based on *Trisetum wolffii* Vasey.

Trisetum muticum Scribn., U. S. Dept. Agr., Div. Agrost. Bul. 11: 50. f. 10. 1898. Based on *Trisetum subspicatum* var. *muticum* Boland.

Graphephorum muticum Heller, Cat. N. Amer. Pl. ed. 2. 31. 1900. Presumably based on *Trisetum subspicatum* var. *muticum* Boland.

Trisetum wolffii var. *brandegei* Louis-Marie, Rhodora 30: 241. 1929. Based on *T. brandegei* Scribn.

Trisetum wolffii var. *brandegei* forma *muticum* Louis-Marie, Rhodora 30: 241. 1929. Based on *T. wolffii* *muticum* Scribn.

(43) TRITICUM L.

(1) *Triticum aestivum* L., Sp. Pl. 85. 1753. Cultivated in Europe.

- Triticum aestivum* Raf., Fl. Ludovic. 16. 1817. Error for *T. aestivum*.
- Triticum hybernum* L., Sp. Pl. 86. 1753. Cultivated in Europe.
- Triticum compositum* L., Syst. Veg. ed. 13. 108. 1774. Egypt. Form with branched spike.
- Triticum sativum* Lam., Fl. Franç. 3: 625. 1778. Cultivated in Europe.
- Triticum vulgare* Vill., Hist. Pl. Dauph. 2: 153. 1787. Cultivated in Europe.
- Triticum vulgare* var. *aestivum* Spenner, Fl. Friburg. 1: 163. 1825. Based on *T. aestivum* L.
- Triticum sativum vulgare* Desv., Opusc. 162. 1831. France.
- Triticum sativum* var. *aestivum* Wood, Class-book ed. 2. 619. 1847. Presumably based on *T. aestivum* L.
- Triticum sativum* var. *compositum* Wood, Class-book ed. 2. 619. 1847. Presumably based on *T. compositum* L.
- Triticum sativum* var. *vulgare* Hack. in Engler and Prantl, Nat. Pflanzenfam. 7: 85. 1887. Based on *T. vulgare* Vill.
- Triticum sativum* var. *vulgare* Vilm., Blumengartn. 1: 1217. 1896. Based on *T. vulgare* Vill.
- Triticum aestivum* var. *hybernum* Farwell, Mich. Acad. Sci. Rpt. 6: 203. 1904. Based on *T. hybernum* L.
- Triticum aestivum* subsp. *vulgare* Thell., Mém. Soc. Sci. Nat. Cherbourg 38: 142. 1912. Based on *T. vulgare* Vill.
- Zeia vulgaris* var. *aestiva* Lunell, Amer. Midl. Nat. 4: 226. 1915. Based on "*Triticum vulgare aestivum* L." error for *T. aestivum*.
- Triticum orientale* Perciv., Wheat Pl. Monogr. 155, 204, f. 134. 1921. Not *T. orientale* Biebers. 1808. Cultivated race from Persia.
- Triticum pyramidale* Perciv., Wheat Pl. Monogr. 156, 262, f. 161, 162. 1921. Cultivated race from Egypt.
- Triticum persicum* Vavilov, in Zhukov., Bul. Appl. Bot. Petrograd 13: 46. 1923. Transcaucasia, Zhukovsky. Not *T. persicum* Aitch. and Hemsley 1888, a species of *Aegilops*.
- Triticum dicoccum* var. *timopheevi* Zhukov., Sci. Papers Appl. Sect. Tiflis Bot. Gard. No. 3: 1. f. 1. 1924. Transcaucasia.
- Triticum timopheevi* Zhukov., Bul. Appl. Bot. Genet., and Plant Breed. 19: 64. f. 1-3. 1928. Based on *T. dicoccum* var. *timopheevi* Zhukov.
- Triticum compactum* Host, Gram. Austr. 4: 4. pl. 7. 1809. Cultivated in Austria.
- Triticum dicoccoides* Koern., Bericht. Deutsch. Bot. Ges. 26: 309. 1908; Aaronsohn, Verh. Zool. Bot. Ges. Wien 59¹⁰: 485. 1909. Palestine.
- Triticum dicoccum* Schrank, Baier. Fl. 1: 389. 1789. Cultivated in Europe.
- Triticum aestivum* subsp. *dicoccum* Thell., Mém. Soc. Sci. Nat. Cherbourg 38: 141. 1912. Based on *T. dicoccum* Schrank.
- Triticum aestivum* var. *dicoccum* Bailey, Gentes Herb. 1: 133. 1923. Based on *T. dicoccum* Schrank.
- Triticum durum* Desf., Fl. Atlant. 1: 114. 1798. North Africa.
- Triticum aestivum* subsp. *durum* Thell., Mém. Soc. Sci. Nat. Cherbourg 38: 143. 1912. Based on *T. durum* Desf.
- Triticum macha* Dekap. and Menab., Bul. Appl. Bot. Genet., and Plant Breed. V. 1: 14, 38. 1932. Transcaspia.
- Triticum monococcum* L., Sp. Pl. 86. 1753. Cultivated in Europe.
- Triticum aestivum* var. *monococcum* Bailey, Gentes Herb. 1: 133. 1923. Based on *T. monococcum* L.
- Triticum polonicum* L., Sp. Pl. ed. 2. 127. 1762. Cultivated in Europe.
- Triticum aestivum* var. *polonicum* Bailey, Man. Cult. Pl. 116. 1924. Based on *T. polonicum* L.
- Triticum spelta* L., Sp. Pl. 86. 1753. Cultivated in Europe.
- Triticum aestivum* subsp. *spelta* Thell., Mitt. Naturw. Ges. Winterthur. 12: 147. 1918. Based on *T. spelta* L.
- Triticum aestivum* var. *spelta* Bailey, Gentes Herb. 1: 133. 1923. Based on *T. spelta* L.
- Triticum sphaerococcum* Perciv., Wheat Pl. Monogr. 157, 321, f. 202. 1921. India and Persia.
- Triticum turgidum* L., Sp. Pl. 86. 1753. Cultivated in Europe.

(22) UNIOLE L.

- (2) *Uniola latifolia* Michx., Fl. Bor. Amer. 1: 70. 1803. The locality as published is Allegheny Mountains, but the type specimen is from Illinois.
- (6) *Uniola laxa* (L.) B. S. P., Prel. Cat. N. Y. 69. 1888. Based on *Holcus laxus* L. *Holcus laxus* L., Sp. Pl. 1048. 1753. Virginia.
- Uniola gracilis* Michx., Fl. Bor. Amer. 1: 71. 1803. Carolina to Georgia, Michaux.
- Uniola virgata* Bartr. ex Pursh, Fl. Amer. Sept. 1: 82. 1814, as synonym of *Uniola gracilis* Michx.
- Chasmanthium gracile* Link, Hort. Berol. 1: 159. 1827. Based on *Uniola gracilis* Michx.
- Uniola uniflora* Benke, Rhodora 31: 148. 1929. Memphis, Tenn., Benke 4874.
- (3) *Uniola nitida* Baldw. in Ell., Bot. S. C. and Ga. 1: 167. 1816. Camden County, Ga., Baldwin.
- Uniola intermedia* Bosc ex Beauv., Ess. Agrost. 75, 181. 1812. Name only. [A Bosc specimen so named in Padua is *U. nitida*; another in Paris is *U. sessiflora*.]

- (4) *Uniola ornithorhyncha* Steud., Syn. Pl. Glum. 1: 280. 1854. Alabama, *Drummond* 51.
Chasmanthium ornithorhynchum Nees ex Steud., Syn. Pl. Glum. 1: 280. 1854, as synonym of *Uniola ornithorhyncha* Steud.
- (1) *Uniola paniculata* L., Sp. Pl. 71. 1753. Carolina.
Briza caroliniana Lam., Encycl. 1: 465. 1785. Carolina.
Uniola maritima Michx., Fl. Bor. Amer. 1: 71. 1803. Carolina, *Michaux*.
Trisiola paniculata Raf., Fl. Ludov. 144. 1817. Based on *Uniola paniculata* L.
Nevroctola maritima Raf. ex Jacks., Ind. Kew. 2: 311. 1894, as synonym of *Uniola paniculata* L.
Nevroctola paniculata Raf. ex Jacks., Ind. Kew. 2: 311. 1894, as synonym of *Uniola paniculata* L.
Uniola floridana Gandog., Soc. Bot. France Bul. 667: 304. 1920. Santa Rosa Island, Fla., *Tracy* 4545.
Uniola heterochroa Gandog., Soc. Bot. France Bul. 667: 304. 1920. Punta Rassa, Fla., *Hitchcock* 535.
Uniola macrostachys Gandog., Soc. Bot. France Bul. 667: 304. 1920. Breton Island, La., *Tracy* 462.
- (5) *Uniola sessiliflora* Poir. in Lam., Encycl. 8: 185. 1808. Carolina, *Bosc*.
Poa sessiliflora Kunth, Rév. Gram. 1: 111. 1829. Based on *Uniola sessiliflora* Poir.
Uniola longifolia Scribn., Torrey Bot. Club Bul. 21: 229. 1894. Georgia [type, De Kalb County, *Small* in 1893], Florida, Mississippi, Tennessee.

(32) VASEYOCHLOA Hitchc.

- (1) *Vaseyochloa multinervosa* (Vasey) Hitchc., Wash. Acad. Sci. Jour. 23: 452. 1933. Based on *Melica multinervosa* Vasey.
Melica multinervosa Vasey, Bot. Gaz. 16: 235. 1891. Brazos Santiago, Tex., *Nealley*.
Distichlis multinervosa Piper, Biol. Soc. Wash. Proc. 18: 147. 1905. Based on *Melica multinervosa* Vasey.
Triodia multinervosa Hitchc., Biol. Soc. Wash. Proc. 41: 159. 1928. Based on *Melica multinervosa* Vasey.

VETIVERIA Bory

- Vetiveria zizanioides* (L.) Nash in Small, Fl. Southeast. U. S. 67. 1903. Based on *Phalaris zizanioides* L.
Phalaris zizanioides L., Mant. Pl. 2: 183. 1771. India.
Andropogon muricatus Retz., Obs. Bot. 3: 43 [31]. 1783. India.
Agrostis verticillata Lam., Encycl. 1: 59. 1783. Not *Agrostis verticillata* Vill., 1779. India.

- Anatherum muricatum* Beauv., Ess. Agrost. 150. pl. 22. f. 10. 1812. Based on *Andropogon muricatus* Retz.
Vetiveria odoratissima Bory in Lem., Bul. Soc. Philom. (Paris) 1822: 43. 1822. Ceylon, island of Bourbon.
Vetiveria odorata Virey, Jour. de Pharm. I. 13: 501. 1827. East Indies.
Vetiveria muricata Griseb., Fl. Brit. W. Ind. 560. 1864. Based on *Andropogon muricatus* Retz.
Vetiveria arundinacea Griseb., Fl. Brit. W. Ind. 559. 1864. Jamaica and Trinidad.
Sorghum zizanioides Kuntze, Rev. Gen. Pl. 2: 791. 1891. Based on *Phalaris zizanioides* L.
Andropogon zizanioides Urban, Symb. Antill. 4: 79. 1903. Based on *Phalaris zizanioides* L.
Holcus zizanioides Kuntze ex Stuck., An. Mus. Nac. Buenos Aires 11: 48. 1904. Based on *Phalaris zizanioides* L.
Anatherum zizanioides Hitchc. and Chase, U. S. Natl. Herb. Contrib. 18: 285. 1917. Based on *Phalaris zizanioides* L.

(104) WILLKOMMIA Hack.

- (1) *Willkommia texana* Hitchc., Bot. Gaz. 35: 283. f. 1. 1903. Ennis, Tex., *J. G. Smith* in 1897.
Craspedorhachis texana Pilger, Bot. Jahrb. 74: 27. 1945. Based on *Willkommia texana* Hitchc.

(168) ZEA L.

- (1) *Zea mays* L., Sp. Pl. 971. 1753. America.
Zea americana Mill., Gard. Dict. ed. 8. Zea No. 1. 1768. West Indies.
Zea vulgaris Mill., Gard. Dict. ed. 8. Zea No. 3. 1768. Northern parts of America.
Mays zea Gaertn., Fruct. et Sem. 1: 6. pl. 1. f. 9. 1788. Based on *Zea mays* L.
Zea segetalis Salisb., Prodr. Stirp. 28. 1796. Based on *Zea mays* L.
Mays americana Baumg., Enum. Stirp. Transsilv. 3: 281. 1816. Based on *Zea mays* L.
Zea mays var. *precox* Torr., in Eaton, Man. Bot. ed. 2. 500. 1818. Northern and Middle States.
Mayzea cerealis Raf., Med. Fl. 2: 241. 1830. Based on *Zea mays* L.
Mayzea cerealis var. *gigantea* Raf., Med. Fl. 2: 241. 1830. Mexico.
Zea hirta Bonaf., Hist. Nat. Mais 29. pl. 4, 39. pl. 4. 1836. Cultivated, seed from California.
Zea mays pensylvanica Bonaf., Hist. Nat. Mais 33. pl. 7. f. 4. 1836. Cultivated.
Zea mays virginica Bonaf., Hist. Nat. Mais 37. pl. 10. f. 15. 1836. Cultivated.
Zea erythrolepis Bonaf., Hist. Nat. Mais

30. pl. 5; 38. pl. 11. f. 17. 1836. Cultivated along Missouri River.
- Zea mais hirta* Alefeld, Landw. Fl. 309. 1866. Based on *Zea hirta* Bonaf.
- Zea saccharata* Sturtev., N. Y. State Agr. Expt. Sta. Rpt. 1884³. 156: 1885. Group name for sweet corn.
- Zea canina* S. Wats., Amer. Acad. Sci. Proc. 26: 160. 1891. Mexico. Hybrid with *Euchlaena mexicana* Schrad., fide G. N. Collins.
- Zea mays saccharata* Bailey, Cycl. Hort. 4: 2006. 1902. Based on *Z. saccharata* Sturtev.
- ZEAL MAYS** var. **EVERTA** (Sturtev.) Bailey, Cycl. Hort. 4: 2005. 1902. Based on *Z. everta* Sturtev.
- Zea everta* Sturtev., N. Y. State Agr. Expt. Sta. Rpt. 1884³. 183. 1885. Group name for popcorn.
- ZEAL MAYS** var. **JAPONICA** (Van Houtte) Wood, Amer. Bot. and Flor. pt. 2: 409. 1871. Presumably based on *Z. japonica* Van Houtte.
- Zea japonica* Van Houtte, Fl. Serr. Jard. 16: 121. 1865. Japan.
- ZEAL MAYS** var. **TUNICATA** Larr. ex St. Hil., Ann. Sci. Nat., Bot. 16: 144. 1829. Uruguay.
- Zea cryptosperma* Bonaf., Hist. Nat. Mais 30, 40. pl. 5 bis. 1836. Based on *Z. mais* var. *tunicata* St. Hil.
- Zea tunicata* Sturtev., Torrey Bot. Club Bul. 21: 335. 1894. Based on *Z. mays* var. *tunicata* St. Hil.
- Of the many names published for forms of *Zea mays* only those based on material from the United States are given above, and of these only such as apply to the better known races. See Sturtevant, N. Y. State Agr. Expt. Sta. Rpt., and the following: Montgomery, The Corn Crops, 15, 1913; Tapley, Enzie, and Van Eseltine, N. Y. State Agr. Exp. Sta. Rpt. 1934: 9-13. 1934.
- (121) **ZIZANIA** L.
- (1) *Zizania aquatica* L., Sp. Pl. 991. 1753. Virginia. [Jamaica, also cited, is erroneous.]
- Zizania clavulosa* Michx., Fl. Bor. Amer. 1: 75. 1803. North America, *Michaux*.
- Hydropyrum esculentum* Link, Hort. Berol. 1: 252. 1827. North America.
- Stipa angulata* L. ex Steud., Nom. Bot. ed. 2. 2: 642. 1841, as synonym of *Hydropyrum esculentum* Link.
- Zizania effusa* Munro, Linn. Soc. Jour. Proc. 6: 52. 1862, as synonym of *Z. aquatica* L.
- Ceratochaete aquatica* Lunell, Amer. Midl. Nat. 4: 214. 1915. Based on *Zizania aquatica* L.
- ZIZANIA** **AQUATICA** var. **ANGUSTIFOLIA** Hitchc., Rhodora 8: 210. 1906. Belgrade, Maine, *Scribner* in 1895.
- Zizania palustris* L., Mant. Pl. 295. 1771. North America.
- Melinum palustre* Link, Handb. Gewächs. 1: 96. 1829. Based on *Zizania palustris* L.
- ZIZANIA** **AQUATICA** var. **INTERIOR** Fassett, Rhodora 26: 158. 1924. Armstrong, Iowa, *Pammel* and *Cratty* 764.
- Zizania interior* Rydb., Brittonia 1: 82. 1931. Based on *Z. aquatica* var. *interior* Fassett.
- (2) *Zizania texana* Hitchc., Wash. Acad. Sci. Jour. 23: 454. 1933. San Marcos, Tex., *Silveus*.
- (122) **ZIZANIOPSIS** Doell and Aschers.
- (1) *Zizaniopsis miliacea* (Michx.) Doell and Aschers. in Doell in Mart., Fl. Bras. 2²: 13. 1871. Presumably based on *Zizania miliacea* Michx.
- Zizania miliacea* Michx., Fl. Bor. Amer. 1: 74. 1803. North America, *Michaux*.
- (94) **ZOYSIA** Willd.
- Zoysia japonica* Steud., Syn. Pl. Glum. 1: 414. 1854. Japan.
- Zoysia pungens* var. *japonica* Hack., Bul. Herb. Boiss. 7: 642. 1899. Based on *Z. japonica* Steud.
- Osterdamia japonica* Hitchc., U. S. Dept. Agr. Bul. 772: 166. 1920. Based on *Zoysia japonica* Steud.
- Zoysia matrella* (L.) Merr., Philippine Jour. Sci. Bot. 7: 230. 1912. Based on *Agrostis matrella* L.
- Agrostis matrella* L., Mant. Pl. 2: 185. 1771. Malabar, India.
- Zoysia pungens* Willd., Gesell. Naturf. Freund. Berlin Neue Schrift. 3: 441. 1801. Malabar, India.
- Osterdamia matrella* Kuntze, Rev. Gen. Pl. 2: 781. 1891. Based on *Agrostis matrella* L.
- Osterdamia zoysia* Honda, Bot. Mag. [Tokyo] 36: 113. 1922. Based on *Zoysia pungens* Willd.
- Zoysia tenuifolia* Willd. ex Trin, Acad. St. Pétersb. Mém. VI. Sci. Nat. 2¹: 96. 1836. Mascarene Islands.
- Osterdamia tenuifolia* Kuntze, Rev. Gen. Pl. 2: 781. 1891. Based on *Zoysia tenuifolia* Willd.
- Zoysia pungens* var. *tenuifolia* Dur. and Schinz, Consp. Fl. Afr. 5: 734. 1894. Based on *Z. tenuifolia* Willd.
- Osterdamia zoysia* var. *tenuifolia* Honda, Bot. Mag. [Tokyo] 36: 113. 1922. Based on *Zoysia tenuifolia* Willd.

UNIDENTIFIED NAMES

The following names of grasses, applied to specimens collected in the United States, cannot be identified from the descriptions, and the types have not been located. Several of these names are not effectively published.

Agrestis viridis Raf., Amer. Month. Mag. 3: 356. 1818. Error for *Agrostis*. Name only. Allegheny Mountains or Ohio.

Agropyron repens var. *nemorale* Anderss. ex Farwell, Mich. Acad. Sci. Rpt. 6: 203. 1904. No basis given, but presumably based on *Triticum repens* var. *nemorale* Anderss., Scandinavia. Specimens so named in the Farwell Herbarium are *Agropyron repens* with awned lemmas. The name was misspelled "nemorak" in Bingham, Cranbrook Inst. Sci. Mich. Bul. 22: 93. 1945.

Agrostis affinis Schult., Mantissa 2: 195. 1824. Based on *Agrostis* No. 17 in Muhlenberg's Descriptio Graminum p. 75. *Sporobolus muhlenbergii* Kunth, Rév. Gram. 1: 68. 1829, and *Vilfa muhlenbergii* Steud., Syn. Pl. Glum. 1: 162. 1854, are also based on this. (See Hitchcock, Bartonica 14: 33. 1932.)

Agrostis altissima var. *laxa* Tuckerm., Amer. Jour. Sci. 45: 44. 1843. White Mountains, N. H., *Trichodium altissimum* var. *laxum* Wood, Class-book ed. 2. 600. 1847, presumably based on this.

Agrostis cylindrica Muhl., Amer. Phil. Soc. Trans. 3: 160. 1793. Name only. Pennsylvania.

Agrostis drummondii Torrey ex Hook., Fl. Antaret. 2: 372. 1847. "East side of the Rocky Mountains." Incidental mention as a form of "*A. exarata* β."

Agrostis michauxii Zuccagni, in Roemer, Col. Bot. 123. 1809. Seed received from Thouin, collected in Kentucky by Michaux. Not *A. michauxii* Trin., 1824?

Agrostis pauciflora Pursh, Fl. Amer. Sept. 1: 63. 1814. Not *A. pauciflora* Schrad., 1806. "On high mountains in Virginia and Carolina." In the Kew Herbarium is a specimen of *Muhlenbergia schreberi* marked "N. Amer. Mr. Fred. Pursh, Herb. propr." but with no name on the label. The description does not agree with this specimen, though it suggests some species of *Muhlenbergia*. *A. oligantha* Roem. and Schult., Syst. Veg. 2: 372. 1817, *Polypogon pauciflorus* Spreng., Syst. Veg. 1: 243. 1825, and *Muhlenbergia tenuiflora pauciflora* Scribn., Torrey Bot. Club Mem. 5: 37. 1894, are based on this.

Agrostis viridis Raf., ex Jacks., Ind. Kew. 1: 65. 1893. Correction for *Agrestis viridis* Raf.

Aira compressa Raf., Amer. Monthly Mag. 3: 356. 1818. [Allegheny Mountains] Name only.

Aira navicularis Schreb. ex Muhl., Amer. Phil. Soc. Trans. 3: 161. 1793. Pennsylvania. Name only.

Aira serotina Torr. ex Trin. in Steud., Nom. Bot. ed. 2. 1: 45. 1840. North America. Name only.

Aira speciosa Muhl., Amer. Phil. Soc. Trans. 3: 161. 1793. Pennsylvania. Name only.

Andropogon digitatus Muhl., Amer. Phil. Soc. Trans. 3: 181. 1793. Pennsylvania. Name only.

Andropogon sessiliflorus Raf., Bot.

Seringe Bul. 1: 221. 1830. United States. Name only, under section *Dimeiostemon*. In Index Kewensis (1: 760. 1893) the name is listed as *Dimeiostemon sessiliflorus* Raf.

Andropogon tener Muhl. ex Merr. and Hu, Bartonica 25: 42. 1949. Name only, error for *Holcus tener* Muhl.

Apluda scirpoides Walt., Fl. Carol. 250. 1788. South Carolina. Not a grass, apparently a sedge.

Arundo confinis Willd., Enum. Pl. 127. 1809. North America. *Calamagrostis confinis* Beauv., Ess. Agrost. 15, 152. 1812. *Deyeuxia confinis* Kunth, Rév. Gram. 1: 76. 1829, and *C. neglecta* var. *confinis* Beal, Grasses N. Amer. 2: 353. 1896, are based on this.

Arundo glauca Hornem., Hort. Hafn. 1: 74. 1813. Not *A. glauca* Bieb., 1808. North America.

Arundo pallens Muhl. ex Steud., Nom. Bot. ed. 2. 1: 144. 1840. Pennsylvania. Name only, in Schrader Herbarium.

Briza virens Walt., Fl. Carol. 79. 1788. Not *B. virens* L., 1762. See Hitchcock, Mo. Bot. Gard. Rpt. 16: 49. 1905. *Poa virens* Jacq., Eclog. Gram. 54. pl. 36. 1820, is based on this. The figure represents a species of *Poa*.

Bromus poaeformis Beiler. Pl. Nov. Herb. Spreng. Cent. 11. 1807. North America. A glabrous annual, possibly *B. secalinus* L.

Bromus pubescens var. *ciliatus* Eaton and Wright, N. Amer. Bot. ed. 8. 161. 1848. Probably a form of *B. purgans* L., not based on *B. ciliatus* L.

Bromus pubescens var. *canadensis* Eaton and Wright, N. Amer. Bot. ed. 8. 161. 1848. Probably a form of *B. purgans* L. Ontario, the only Canadian locality cited.

Calamagrostis pumilia Nutt. ex A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 334. 1863. Not *C. pumila* Hook., 1851. Name only for a plant collected in the Rocky Mountains by Nuttall.

Calotheca macrostachya Presl, Rel. Haenk. 1: 268, 351. 1830. In Addenda et Corrigenda (p. 351) the original "in montanis Peruviae. . ." is changed to "ad Monte-Rey Californiae." This locality, as in the case of several other species described by Presl, is erroneous. (See Hitchcock, U. S. Natl. Herb. Contrib. 24: 335. 1927.)

Cenchrus carolinianus Walt., Fl. Carol. 79. 1788. South Carolina. (See Chase, U. S. Natl. Herb. Contrib. 22: 76. 1920.)

Cenchrus gracilis Beauv., Ess. Agrost. 57, 157. 1812. Name only for a specimen sent by Bosc, presumably from the Carolinas.

Chloris longibarba Michx. ex Beauv., Ess. Agrost. 79, 158. 1812. Name only.

Deyeuxia airoides Beauv., Ess. Agrost. 44, 152, 160. 1812. "*Arundo airoides* Mich. ined." is referred to *Deyeuxia*. *Arundo airoides* Lam. was described from a plant collected in North America by Michaux

and is probably the species Beauvois had in mind. Lamarck's description suggests *Trisetum melicoides* (Michx.) Scribner, which was collected by Michaux and described by him as *Aira melicoides*.

Deyeuxia halleriana Vasey, Grasses U. S. Descr. Cat. 50. 1885. Name only for a specimen from Washington Territory.

Digitaria setigera Roth in Roem. and Schult., Syst. Veg. 2: 474. 1817. "India orientali, Heyne." Link (Hort. Berol. 1: 225. 1827.) uses this name for *D. horizontalis* Willd., giving "Brasilia" as locality. The name is used in the same sense by Grisebach (Fl. Brit. W. Ind. 544. 1864.) and by others. So far as known, *S. horizontalis* has not been found in India.

Dilepyrum angustifolium Raf., Med. Fl. 2: 249. 1830. Name only, *Dilepyrum* is change of name for "*Orizopsis* Michx."

Eleusine ciliata Raf., Precis Decour. Somiol. 45. 1814. Name only.

Eragrostis alba Presl, Rel. Haenk. 1: 279. 1830. "Monte-Rey, California," Haenke. Locality erroneous, the plant probably collected in Peru.

Eragrostis caroliniana Scribn., Torrey Bot. Club Bul. 5: 49. 1894. Based on *Poa caroliniana* Bieler.

Eragrostis lugens var. *major* Vasey ex L. H. Dewey, U. S. Natl. Herb. Contrib. 2: 542. 1894. "Texas to Arizona and eastward to Florida."

Eragrostis pilosa var. *caroliniana* Farwell, Mich. Acad. Sci. Rpt. 17: 182. 1916. Based on *Poa caroliniana* Bieler.

Festuca duriuscula var. *pubiculmis* Hack. ex Rohlena, Sitzb. Bohm. Ges. Wiss. Math. Naturw. Cl. 24: 4. 1899, descr. in Bohemian. "Roztok" [Bohemia]. This name, published as a new combination by Farwell, Mich. Acad. Sci. Papers 26: 7. 1940, based on "*Festuca ovina* var. *pubiculmis* Hackel," error for *F. ovina* var. *pubiculmis* (Hack.) Aschers. and Graebn., Syn. Mitteleur. Fl. 2: 470. 1900. Specimens so named by Farwell in his herbarium in Cranbrook Institute are *F. rubra*.

Festuca glabra Spreng., Syst. Veg. 1: 353. 1825. Not *F. glabra* Lightf., 1777. Long Island, N. Y. The description suggests *Puccinellia distans* (L.) Parl.

Flexularia compressa Raf., Jour. Phys. Chym. 89: 105. 1819. Kentucky and Ohio.

Holcus tener Schreb. ex Muhl., Amer. Phil. Soc. Trans. 3: 182. 1793. Name only.

Koeleria airoides Nutt. ex Steud., Nom. Bot. 456. 1821. Name only. Referred doubtfully in Index Kewensis to *Arundo airoides* Lam.

Leptopyrum tenellum Raf., Med. Repos. N. Y. 5: 351. 1808. [United States.] Name only.

Lolium canadense Michx. ex Brouss., Elench. Pl. Hort. Monsp. 35. 1805, name only; Roem. and Schult., Syst. Veg. 2: 893.

1817. Grown in Montpellier. The description rather suggests a tall plant of *L. perenne* L. *Lolium temulentum* var. *canadense* Wood, Amer. Bot. and Flor. pt. 2: 406. 1871, based on this.

Melica altissima Walt., Fl. Carol. 78. 1788. Not *M. altissima* L., 1753. (See Hitchcock, Mo. Bot. Gard. Rpt. 16: 47. 1905.)

Muhlenbergia anemagrostoides Trin. ex Steud., Nom. Bot. ed. 2. 2: 164. 1841. America. Name only.

Muhlenbergia sylvatica var. *vulpina* Wood, Amer. Bot. and Flor. pt. 2: 86. 1871. New York, Lord.

Panicum buckleyanum var. *maius* Lunell, Amer. Midl. Nat. 4: 222. 1915. Change of name for "*Poa tenuifolia* var. *maior* (Vasey)," but that name was never published, and no specimen so named by Vasey can be found.

Panicum americanum L., Sp. Pl. 56. 1753. America. This name and *Pennisetum americanum* Schum., based on it, have been used for *P. glaucum* (L.) R. Br. The original description is unidentifiable, probably based on a confusion of two or more species. (See Chase, U. S. Natl. Herb. Contrib. 22: 218. 1921; Amer. Jour. Bot. 8: 43. 1921.)

Panicum anomalum Walt., Fl. Carol. 72. 1788. South Carolina. A species of *Setaria*. (See Hitchcock, Mo. Bot. Gard. Rpt. 16: 35. 1905.)

Panicum barbatum LeConte ex Torr., in Eaton, Man. Bot. ed. 2. 342. 1818. Not *P. barbatum* Lam., 1791. New York. The description rather suggests *P. barbula* Michx.

Panicum cartilagineum Muhl., Descr. Gram. 128. 1817. Georgia. (See Hitchcock, Barton 14: 41. 1932.)

Panicum debile Torr. ex Steud., Nom. Bot. ed. 2. 2: 255, 262. 1841. Not *P. debile* Desf., 1798. As synonym of *P. pubescens* Lam.

Panicum densum Muhl., Descr. Gram. 122. 1817. No locality given. The description suggests one of the Lanuginosa group.

Panicum dichotomum var. *curvatum* Torr., Fl. North. and Mid. U. S. 145. 1824. No locality given.

Panicum dichotomum var. *gracile* Torr., Fl. North. and Mid. U. S. 145. 1824. "Common in swamps, New York."

Panicum dichotomum var. *pubescens* Munro, in Benth., Pl. Hartw. 341. 1857. Sacramento, Calif., Hartweg. Name only.

Panicum dichotomum var. *spathaceum* Wood, Amer. Bot. and Flor. pt. 2: 393. 1871. No locality mentioned.

Panicum discolor Bieler, Pl. Nov. Herb. Spreng. Cent. 4. 1807. Pennsylvania. A species of the subgenus *Dichanthelium*.

Panicum elliottii Spreng. ex Steud., Nom. Bot. ed. 2. 2: 256. 1841. Not *P. elliottii* Trin., 1829. As synonym of *P. pubescens* [Lam., p. 262].

Panicum fimbriatum Willd. ex Spreng.,

Syst. Veg. 1: 316. 1825, as synonym of *P. viscidum* Ell. [*P. scoparium* Lam.] South Carolina. A specimen in the Willdenow Herbarium so named is *P. albomaculatum* Scribn., from Mexico, collected by Humboldt.

Panicum flexuosum Raf., Precis. Découv. Somiol. 45. 1814; Jour. Bot. Desv. 4: 273. 1814. Not *P. flexuosum* Retz., 1783. New Jersey. *P. rafinesquianum* Schult., Mantissa 2: 257. 1824, is based on this.

Panicum gracilescens Desv. ex Poir., in Lam., Encycl. Sup. 4: 279. 1816. Carolina. Desvaux gives a later description (Opusc. 95. 1831), which disagrees in some respects with that of Poir.

Panicum hirtellum Bartr., Travels 430. 1791. Not *P. hirtellum* L., 1759. Banks of the Mississippi River in Louisiana. The description suggests a species of *Echinochloa*.

Panicum iowense Ashe, N. C. Agr. Expt. Sta. Bul. 175: 115. 1900. Iowa to Kansas. The description suggests *P. huachucae* or *P. praecocius*. (See Contrib. U. S. Natl. Herb. 15: 330. 1910.)

Panicum muhlenbergianum Schult., Mantissa 2: 230. 1824. Based on *Panicum* No. 27 of Muhlenberg's Descriptio Graminum, the description of which is copied. Muhlenberg gives "Habitat in Georgia."

Panicum nitidum var. *glabrum* Torr., Fl. North. and Mid. U. S. 146. 1824. No locality cited. The description suggests *P. commutatum* Schult.

Panicum nitidum var. *gracile* Torr., Fl. North. and Mid. U. S. 146. 1824. Near New York. The description applies fairly well to the vernal phase of *P. dichotomum* L.

Panicum nitidum var. *majus* Vasey, U. S. Natl. Herb. Contrib. 3: 30. 1892. No locality cited. Vasey says, "Here could be placed several variable forms."

Panicum pensylvanicum Spreng., Nachtr. Bot. Gart. Halle 30. 1801. Pennsylvania.

Panicum pilosum Muhl., Amer. Phil. Soc. Trans. 4: 236. 1799. Pennsylvania. Name only.

Panicum pumilum Raf., Med. Repos. N. Y. 5: 353. 1808. Name only.

Panicum speciosum Walt., Fl. Carol. 73. 1788. South Carolina. The description faintly suggests *Sporobolus junceus* (Michx.) Kunth.

Panicum uniflorum Raf., Amer. Monthly Mag. 2: 120. 1817. Flatbush, N. Y. Some species of subgenus *Dichanthelium*.

Panicum vilifforme Wood, Class-book ed. 3. 785. 1861. East Tennessee. Appears to be a species of the group *Agrostoidia*.

Paspalum compressum Raf., Fl. Ludov. 15. 1817. Louisiana prairies, Robin.

Paspalum dasyphyllum var. *floridanum* Wood, Amer. Bot. and Flor. pt. 2: 390. 1871. [Florida.]

Paspalum geniculatum Raf., Fl. Ludov. 15. 1817. Louisiana, Robin.

Paspalum supinum Rich. ex Hornem.,

Hort. Hafn. 1: 77. 1813. Not *P. supinum* Bosc, 1804. Baltimore, introduced in the Royal Botanic Garden in Copenhagen in 1807. Probably *P. pubescens* Muhl.

Paspalum virgatum var. *latifolium* Wood, Amer. Bot. and Flor. pt. 2: 390. 1871. Eastern States. Wood's *P. virgatum* appears to be *Paspalum boscianum* Flügge; the variety may be a luxuriant form of this species.

Pennisetum glaucum var. *purpurascens* Eaton and Wright, N. Amer. Bot. ed. 8. 346. 1840. Virginia and northward.

Poa alata Desv., Opusc. 102. 1831. "Carolina?" Locality erroneous, the type is *Eragrostis maypurensis* (H. B. K.) Steud., of the American tropics.

Poa caesia var. *strictior* A. Gray, Man. ed. 5. 629. 1867. "Lake Superior, C. G. Loring, especially Isle Royale, Prof. Whitney."

Poa capillaris L., misapplied by Link, Enum. Pl. 1: 88. 1821. "*P. caroliniana* Spreng." cited as synonym.

Poa caroliniana Bieler, Pl. Nov. Herb. Spreng. Cent. 10. 1807. North Carolina. Said to be similar to "*P. cilianensis*." [*Eragrostis cilianensis* (All.) Lutati.]

Poa glauca var. *strictior* Jones, West. Bot. Contrib. 14: 14. 1912. Based on *P. caesia* var. *strictior* A. Gray.

Poa multicaulis Raf. ex M'Murtrie, Sk. Louisv. 223. 1819. Kentucky. Name only.

Poa nemoralis [L., misapplied by] Pursh, Fl. Amer. Sept. 1: 79. 1814. North America.

Poa nutans Muhl., Amer. Phil. Soc. Trans. 3: 161. 1793. Pennsylvania. Name only.

Poa repens Muhl., Amer. Phil. Soc. Trans. 3: 161. 1793. Pennsylvania. Name only.

Poa rubra Muhl., Amer. Phil. Soc. Trans. 4: 436. 1799. Pennsylvania. Name only.

Poa subaristata (Scribn.) orendensis Williams ex Pammel, Iowa Acad. Sci. Proc. 20: 144. 1915. Name only for Pammel, Johnson, Lummis, Buchanan 940. Uintah Mountains, Utah.

Poa tenuiflora Raf., Med. Repos. N. Y. 5: 353. 1808. [United States.] Name only.

Saccharifera spontanea Stokes, Bot. Mat. Med. 1: 132. 1812. South Carolina. Probably a species of *Erianthus*.

Sesleria americana Nees ex Steud. "Ins. Staatenland. Am. septr." The type, in the Lindley Herbarium in Cambridge, is labeled "Staten Island. 'Chanticleer.' Webster in 1829." The specimen is one of the group related to *Poa flabellata* (Lam.) Rasp. found in the region of the Straits of Magellan, "Staten Island" obviously referring to the island of that name to the east of Terra del Fuego.

Stipa expansa Poir. in Lam., Encycl. 7: 453. 1806. Carolina, Bosc. This has been taken for the basis of *Muhlenbergia expansa* Trin., but Poir. description does not

apply to that, and both DeCandolle and Trinius question Poiret's species.

Stipa spicata Walt., Fl. Carol. 78. 1788. Not *S. spicata* L. f., 1781. South Carolina. Apparently a species of *Andropogon*.

Stipa stricta Lam., Tabl. Encycl. 1: 158. 1791.; Encycl. 7: 453. 1806. South Carolina. Fraser. Said to have the aspect of *Andropogon*. Possibly *Sorghastrum nutans* (L.) Nash.

Triodia repens Vasey, Torrey Bot. Club Bul. 15: 49. 1888. Name only for a specimen collected by "Nealley, Western Texas."

Triticum aegilopoides Thurb. ex A. Gray, Acad. Nat. Sci. Phila. Proc. 1863: 79. 1863. Name only. Rocky Mts., Hall and Harbour 656.

Vilfa varians Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 89. 1863. Rocky Mountains, Nuttall. Apparently a species of *Sporobolus*.

The following names, based on Old World types, have been applied to species of the United States. The types have not been examined.

Echinochloa crusgalli forma *longiset*a Farwell, Mich. Acad. Sci. Rpt. 21: 349. 1920. Based on *Panicum crusgalli* var. *longisetum* Trin. This variety, from Astrakhan, U. S. S. R., as represented in Trin., Gram. Icon. 2: pl. 162. 1828, is not known from America. Farwell probably had *Panicum longisetum* Torr., 1822, in mind.

Echinochloa stagnina (Retz.) Beauv., Ess. Agrost. 53, 161, 171. 1812, based on *Panicum stagninum* Retz., a species of the East Indies and the Pacific Islands has a coarsely hairy ligule, while the specimen distributed by Gray Herbarium under this name (Fernald, Long, and Clement 15182, Princess Anne County, Va.) is entirely without ligule, as in *E. crusgalli* and its allies.

Lolium multiflorum submuticum Mutel, Fl. Franc. 4: 139. 1839. France.

Phleum pratense var. *nodosum* (L.) Huds., Fl. Ang. ed. 2. 26. 1778. Based on *P. nodosum* L. A specimen of *P. pratense* L. from Virginia (Fernald and Long 12935) with slightly curved base has been recorded under this name. It is not *P. nodosum* L. (upon which the variety is based), which is a much smaller plant, decumbent at base, with few to several swollen nodes and short internodes, the panicle shorter and more slender; not known from America.

Phragmites communis forma *repens* G. F. W. Meyer, Chloris Hanov. 650. 1836. Germany. Applied to a Michigan specimen with long stolons.

Poa annua var. *aquatica* Aschers., Fl. Brand. 1: 844. 1864. Germany. Applied to a specimen from flooded place.

Poa annua var. *reptans* Hausskn., Mitt. Thüring. Bot. Ver. 9: 7. 1891. Germany.

Poa glauca subsp. *conferta* (Blytt) Lindm.

in Holmb., Skand. Fl. 2: 208. 1926. Based on *P. conferta* Blytt. Minnesota specimens distributed under this name are referred to *P. glauca* Vahl.

Poa glauca subsp. *conferta* var. *laxiuscula* (Blytt) Lindm. in Holmb., Skand. Fl. 2: 208. 1926. Based on *P. aspera* var. *laxiuscula* Blytt. Minnesota specimens so named are referred to *P. glauca* Vahl.

Poa nemoralis var. *montana* Gaudin, Alpina 3: 27. 1808. Switzerland. Minnesota specimens distributed under this name do not agree with Gaudin's description, nor that of Ascherson and Graebner. They appear to be rather small specimens of *Poa interior* Rydb.

PERSONS FOR WHOM GRASSES HAVE BEEN NAMED²⁴

This list includes names of persons for whom valid genera, species, or varieties of grasses in the Manual have been named.

Addison. See Brown.

Alexander, Annie M. (1867-). Botanical and zoological collector, Oakland, Calif.; collections mainly from western North America and Hawaii. *Ectosperma alexandrae*.

Anderson, Charles Lewis (1827-1910). Practicing physician of Carson City, Nev., and Santa Cruz, Calif.; correspondent of Asa Gray. *Stipa lepida* var. *andersoni*.

Arsène, Hermano Gerefroy (1867-1938). Professor in Sacred Heart Training College, Las Vegas, N. Mex.; collected extensively in Mexico. *Muhlenbergia arsenei*.

Ashe, William Willard (1872-1932). Botanist and forester, U. S. Forest Service. *Panicum ashei*.

Baker, Charles Fuller (1872-1927). Botanist and entomologist, teacher and administrator, who collected in Colorado, California, Cuba, and the Philippine Islands. *Agropyron bakeri*; *Agrostis bakeri*.

Baker, Charles Henry (1848-). Horticulturist, collector of fruits and seeds, resident of Oakland, Allegheny County, Pa., and Orange County, Fla. *Spartina bakeri*.

Barrelieri, Jacques (1606-73). French medical botanist, author of a work on the plants of France, Spain, and Italy. *Eragrostis barrelieri*.

Beckmann, Johann (1739-1811). German botanist, author of a botanical lexicon. *Beckmannia*.

Bélanger, Charles Paulus (1805-81). French botanist, who collected extensively in the Old World. When Steudel described *Antheophora belangeri* (*Hilaria belangeri*) the specific name *belangeri* was used, apparently through inadvertence, instead of one for Jean Louis Berlandier (1805-51), who collected the type specimen in Mexico. Bélanger botanized in Martinique, but apparently never in Mexico.

²⁴ Revised by Joseph A. Ewan, Tulane University.

Berg, Federico Guillermo Carlos (1843-1902). Director, Museo Nacional de Buenos Aires. *Panicum bergii*.

Bertero, Carlo Giuseppe (1789-1831). Italian botanical explorer, resident in Chile 1827-30, lost at sea on his return from Tahiti. *Tragus berteronianus*.

Beyrich, Heinrich Karl (1796-1834). Prussian botanical explorer, visited Brazil 1822-23 and subsequently Virginia, the Carolinas, and Georgia; died at Fort Gibson when exploring Arkansas Territory. *Eragrostis beyrichii*.

Bicknell, Eugene Pintard (1859-1925). New York banker, amateur botanist, and collector of local flora. *Panicum bicknellii*.

Bigelow, John Milton (1804-78). Surgeon-botanist, with Mexican Boundary Survey and Lieutenant Whipple's railroad survey along 35th parallel. *Blepharidachne bigelovii*; *Poa bigelovii*.

Blasdale, Walter Charles (1871-). Professor of chemistry at University of California and amateur botanist. *Agrostis blasdalei*.

Blodgett, John Loomis (1809-53). Physician and druggist of Key West, first important botanical collector among the lower Florida Keys. *Paspalum blodgettii*.

Bloomer, Hiram G. (1821-74). Pioneer botanist of California, active member of the California Academy of Sciences. *Oryzopsis bloomeri*.

Bolander, Henry Nicholas (1831-97). California botanist, teacher, collaborator in State Geological Survey, and special student of cryptogams. *Calamagrostis bolanderi*; *Poa bolanderi*; *Scribneria bolanderi*.

Bosc, Louis Augustin Guillaume (1759-1828). French botanist, who visited the Carolinas 1798-1800, author of a treatise on oaks. *Panicum boscii*; *Paspalum boscianum*.

Boutelou, Claudio (1774-1842) and his brother Estéban (1776-1813). Lagasca named the genus *Bouteloua* for them; Claudio was professor of agriculture in Madrid.

Brewer, William Henry (1828-1910). California botanist, onetime professor at Yale University, whose narrative journal was published under the title "Up and Down California." *Calamagrostis breweri*.

Brown, Addison (1830-1913). New York judge, amateur botanist, patron of New York Botanical Garden. *Panicum addisonii*.

Buckley, Samuel Botsford (1809-83). Southern naturalist and collector, twice State Geologist of Texas, described grasses from Texas and Oregon. *Sporobolus buckleyi*; *Tridens buckleyanus*.

Cabanis, Jean (1816-1906). German ornithologist, who collected plants in Florida. *Andropogon cabanisii*.

Cain, Stanley Adair (1902-). Plant geographer and botanist of Indiana and Tennessee. *Calamagrostis cainii*.

Canby, William Marriott (1831-1904).

Wilmington, Del., merchant and banker, amateur botanist. *Poa canbyi*.

Chaix, Abbé Dominique (1731-1800). French botanist, collaborator with Dominique Villars on treatise on French plants. *Poa chaixii*.

Chapman, Alvan Wentworth (1809-99). Botanist of Apalachicola, Fla., and author of Flora of the Southern United States. *Gymnopogon chapmanianus*; *Panicum chapmani*; *Poa chapmaniana*; *Tridens chapmani*.

Clute, Willard Nelson (1869-). Professor of botany, Butler University, Ind., and student of vascular cryptogams. *Panicum clutei*.

Combs, Robert (1872-99). Botanical collector in Florida and Cuba. *Panicum combsii*.

Commons, Albert (1829-1919). Amateur botanist of Delaware, collector of local flora. *Panicum commonsianum*.

Cooke, William Bridge (1908-). California botanist, devoted to the flora of the Mount Shasta region. *Glyceria cookei* (*G. declinata*).

Cotta, Heinrich (1763-1844). German plant physiologist. *Cottea*.

Curtiss, Allen Hiram (1845-1907). Botanical collector of Jacksonville, Fla. *Aristida curtissii*; *Calamovilfa curtissii*; *Sporobolus curtissii*.

Cusick, William Conklin (1842-1922). Oregon botanist, who explored the Willamette Mountains and eastern Oregon. *Poa cusickii*.

Danthione, Étienne (fl. 1800-15). French botanist, author of an unpublished account of grasses of Marseille region. *Danthonia*.

Davy, Joseph Burt (1870-1940). English botanist, professor at Oxford University, onetime resident of California and author of a grass flora of central California. *Pleuropogon davyi*.

Deam, Charles Clemon (1865-). Veteran Indiana botanist, forester, author of a Flora of Indiana and Grasses of Indiana. *Panicum deamii*.

Deschamps, L. A. (1766-). Surgeon-naturalist on *Recherche* sent out by French Government under D'Entrecasteaux in 1791 in search of La Pérouse. *Deschampsia*.

Desmazières, Jean Baptiste Henri Joseph (1796-1862). French botanist, author of a work on grasses of northern France. *Desmazeria*.

Deyeux, Nicholas (1753-1837). French botanist. *Deyeuxia*.

Douglas, David (1799-1834). British botanical explorer, who visited the Pacific Northwest, California, and the Hawaiian Islands. *Poa douglasii*.

Drummond, Thomas (1780-1835). Scotch nurseryman and botanical explorer, curator of Belfast Botanic Garden, member of Second Franklin Expedition, who collected in the Canadian Rockies and in Texas. *Sorghum vulgare* var. *drummondii*.

Dumont-d'Urville, Jules Sebastien Cesar (1790-1842). French explorer, commander of the expeditions of the *Astrolabe* and the *Zélée* around the world. *Panicum urvilleanum*; *Paspalum urvillei*.

Eastwood, Alice (1859-). California botanist, longtime curator of botany at California Academy of Sciences. *Festuca eastwoodae*.

Ehrhart, Friedrich (1742-95). Swiss-born assistant to an apothecary in Germany, pupil of Linnaeus; especially interested in grasses, rushes, and ferns. *Ehrharta*.

Elliott, Stephen (1771-1830). Pioneer South Carolina botanist and legislator. *Agrostis elliottiana*; *Andropogon elliottii*; *Sorghastrum elliottii*.

Elmer, Adolph Daniel Edward (1870-1942). Botanist and collector, first in California, then in Washington State, and a longtime resident of the Philippine Islands, author of an enumeration of Philippine flora. *Agropyron elmeri*; *Festuca elmeri*; *Stipa elmeri*.

Emersley, J. D. Botanical collector in the Southwestern States. *Muhlenbergia emersleyi*.

Faber, Ernest (1839-99). Missionary, botanical collector, and student of Chinese botany. *Setaria faberii*.

Fendler, August (1813-83). German-American botanical explorer of New Mexico, Venezuela, Panama, and Trinidad. *Aristida fendleriana*; *Poa fendleriana*.

Fernald, Merritt Lyndon (1873-). Professor of botany, Harvard University, and longtime Director of Gray Herbarium. *Glyceria fernaldii*; *Poa fernaldiana*; *Calamagrostis fernaldii*.

Frank, Joseph C. (1782-1835). German botanical collector, who visited Ohio and New Orleans. *Eragrostis frankii*.

Gattinger, Augustin (1825-1903). Pioneer botanist of Tennessee and author of a flora of that State. *Panicum gattingeri*.

Gay, Jacques Étienne (1786-1864). French botanist, onetime Secretary of Chamber of Peers, who visited Africa for plants. *Chloris gayana*.

Geyer, Carl Andreas (1809-53). Botanical explorer, born in Dresden, Germany, who collected first in Illinois, later in the Missouri River country and in Oregon Territory. *Melica geyeri*.

Ghiesbreght, August (1810-93). Belgian botanical collector, who repeatedly visited Mexico for short to long residences. *Panicum ghiesbreghtii*.

Gouin, ——— (fl. 1860-70). French physician, chief of military hospital at Vera Cruz, member of French Scientific Commission to Mexico, 1865-66. *Panicum gouini*.

Gray, Asa (1818-88). Distinguished professor of botany, Harvard University, and best known American botanist of nineteenth century. *Festuca grayi*.

Greene, Edward Lee (1843-1915). First professor of botany, University of California, botanical explorer in New Mexico, Colorado, and California, botanical editor and critic. *Orcuttia greenei*.

Griffiths, David (1867-1935). Botanist, U. S. Department of Agriculture, devoted to xerophytic flora of Southwest. *Agropyron griffithsii*.

Grisebach, August Heinrich Rudolf (1814-79). German botanist, author of Flora of the British West Indian Islands. *Setaria grisebachii*.

Gussone, Giovanni (1787-1866). Italian botanist, professor of botany in Naples. *Bromus rigidus* var. *gussonii*.

Hackel, Eduard (1850-1926). Eminent Austrian agrostologist. *Hackelochloa*.

Hall, Elihu (1822-82). Illinois botanical collector, who visited Texas, Colorado, and Oregon. *Agrostis hallii*; *Andropogon hallii*; *Panicum hallii*.

Hall, Harvey Monroe (1874-1932). Professor of botany, University of California, specialist in taxonomy of Compositae and pioneer in use of transplant method. *Bromus orcuttianus* var. *hallii*.

Hansen, George (1863-1908). Resident botanical collector of Amador County, California. *Sitanion hansenii*.

Harford, William George Washington (1825-1911). Pioneer California conchologist, colleague of Bolander and Kellogg in the early California Academy of Sciences. *Melica harfordii*.

Hartweg, Carl Theodor (1812-71). German botanical explorer, sent by Horticultural Society of London to Mexico, California, and Andes to collect plants and seeds. *Paspalum hartwegianum*.

Havard, Valery (1846-1927). Major surgeon, U. S. Army, born in France, who collected in Texas. *Panicum havardii*.

Heller, Amos Arthur (1867-1944). Botanist, founder and editor of journal *Muhlenbergia*, who collected in the western United States, also Hawaiian Islands, and Puerto Rico. *Panicum helleri*.

Henderson, Louis Fourniquet (1853-1942). Pioneer botanist of Pacific Northwest, longtime curator, University of Oregon Herbarium, Eugene. *Agrostis hendersonii*; *Oryzopsis hendersonii*.

Hilaire. See St. Hilaire.

Hillman, Frederick Hebard (1863-). Botanist, U. S. Department of Agriculture, engaged upon seed morphology. *Panicum hillmani*.

Hitchcock, Albert Spear (1865-1935). Eminent American agrostologist and widely traveled plant explorer. *Trichachne hitchcockii*.

Hooker, William Jackson (1785-1865). Distinguished British botanist, Director, Royal Botanic Gardens, Kew, editor and author of many botanical works. *Helictotrichum hookeri*.

trichon hookeri; *Imperata hookeri*; *Sporobolus asper* var. *hookeri*.

Hoover, Robert Francis (1913-). California botanist, devoted to flora of the Great Valley. *Pleuropogon hooverianus*; *Agrostis hooveri*.

Howell, Thomas Jefferson (1842-1912). Oregon botanist, author of Flora of Northwest America. *Agrostis howellii*; *Alopecurus howellii*; *Calamagrostis howellii*; *Festuca howellii*; *Poa howellii*.

Imperato, Ferrante (1550-1625). Apothecary in Naples, author of a rare folio work on natural history. *Imperata*.

James, Edwin (1797-1861). Surgeon-botanist with Stephen H. Long's expedition to the Rocky Mountains, and first white man to ascend a 14,000-foot peak in the United States (Pikes Peak). *Hilaria jamesii*.

Jepson, Willis Linn (1867-1946). Long-time professor of botany, University of California, author of a Flora of California. *Elymus glaucus* var. *jepsoni*.

Jones, Marcus Eugene (1852-1934). One-time teacher, mining engineer, and botanist, who collected widely in the western United States and Mexico. *Muhlenbergia jonesii*.

Joor, Joseph Finley (1849-92). Native of Louisiana, onetime physician of New Orleans and at least three small towns in Texas, professor of botany, Tulane University, 1886-92. *Panicum joori*.

Kalm, Pehr (Peter) (1715-79). Swedish botanist and correspondent of Linnaeus, who collected in southeastern Canada and the northeastern United States. *Bromus kalmii*.

Kellogg, Albert (1813-87). Physician, pioneer botanist of California, one of the founders of California Academy of Sciences. *Poa kelloggii*.

Kennedy, Patrick Beveridge (1874-1930). Agronomist, University of California, Berkeley. *Agrostis kennedyana*.

King, Clarence (1842-1901). Mountaineer, geologist, explorer, in charge of survey of fortieth parallel across the Great Basin. *Blepharidachne kingii*; *Hesperochloa kingii*; *Oryzopsis kingii*.

Koeler, George Ludwig (1765-1807). German botanist, professor in Mainz, author of a work on grasses of France and Germany. *Koeleria*.

Lamarck, Jean Baptiste Antoine Pierre Monnet de (1744-1829). Eminent French naturalist, author of works on botany, heredity, and conchology. *Lamarckia*.

Lange, Johan Martin Christian (1818-98). Danish botanist, professor of botany in Copenhagen. *Paspalum langei*.

Leers, Johann Daniel (1727-74). German apothecary, author of a work on local flora. *Leersia*.

Leiberg, John Bernhard (1853-1913). American forest surveyor, who collected plants in Idaho and the Pacific States. *Panicum leibergii*; *Poa leibergii*.

Lemmon, John Gill (1832-1908). Botanist

of California, onetime State Forester, correspondent of Asa Gray, and botanical explorer. *Eriochloa lemmoni*; *Phalaris lemmoni*; *Puccinellia lemmoni*; *Stipa lemmoni*.

Leprieur, F. R. (-1869). French botanical explorer, who traveled in Senegal and French Guiana, 1830-36. *Chloris priouri*.

Letterman, George Washington (1841-1913). Teacher in public schools of Allenton, Mo., botanical collector chiefly in Missouri and the Southern States. *Poa lettermani*; *Stipa lettermani*.

Liebmann, Frederik Michael (1813-56). Danish botanist, who collected in Mexico. *Setaria liebmanni*.

Lindheimer, Ferdinand Jakob (1801-79). German-born resident, botanical collector and newspaper editor of New Brunfels, Tex., who sent plants to Asa Gray 1843-52. *Muhlenbergia lindheimeri*; *Panicum lindheimeri*.

Macoun, James Melville (1862-1920). Canadian botanist, son of John Macoun. *Calamagrostis canadensis* var. *macouniana*.

Macoun, John (1832-1920). Canadian botanist. *Elymus macounii*.

Marsh, Ernest George, Jr. (1915-). Wildlife technician of Austin, Tex., who traveled in northern Texas on Farmer Fellowship during 1936-38. *Muhlenbergia marshii*.

Metcalfe, Orrick Baylor (1879-1936). Plant ecologist who botanized in New Mexico between 1902-04. *Muhlenbergia metcalfei*.

Michaux, André (1746-1802). French botanist, who explored eastern United States, author of Flora Boreali-Americana. *Eriochloa michauxii*.

Mohr, Charles Theodore (1824-1901). German-born botanist, who traveled widely, for more than 40 years pharmacist of Mobile, Ala., and author of Plant Life of Alabama. *Andropogon mohrii*; *Aristida mohrii*.

Molina, Juan Ignazio (later Giovanni Ignazio) (1740-1829). Chilean Jesuit missionary and botanist, author of first comprehensive summary of Chilean plants. *Molinia*.

Morton, Julius Sterling (1832-1902). Agriculturalist and historian, onetime Nebraska magazine editor, Secretary of Agriculture 1893-97. *Helictotrichon mortonianum*.

Muhlenberg, Gotthilf Heinrich Ernst (1753-1815). Pennsylvania born, pastor of a Lutheran church at Lancaster, pioneer botanist, author of Descriptio Ueberior Graminum. *Muhlenbergia*; *Amphicarpum muhlenbergianum*.

Munro, William (1818-80). British botanist, who wrote on grasses. *Munroa*.

Nealley, Greenleaf Cilley (1846-96). Botanical collector, went to Texas in 1882, later commissioned by U. S. Department of Agriculture to explore southwestern Texas

for grasses and forage plants. *Leptochloa nealleyi*; *Sporobolus nealleyi*; *Tridens nealleyi*.

Nees von Esenbeck, Christian Gottfried Daniel (1776-1858). Eminent German botanist, professor of botany in Breslau, author of *Agrostologia Brasiliensis*. *Stipa neesiana*.

Nelson, Aven (1859-). Longtime professor of botany, University of Wyoming, author of a manual of Rocky Mountain plants. *Stipa columbiana* var. *nelsoni*.

Nuttall, Thomas (1786-1859). English-American naturalist, onetime professor of botany, Harvard University ("Old Curious" of Dana's Two Years Before the Mast), collector and author. *Puccinellia nuttalliana* (*P. airoides*).

Orcutt, Charles Russell (1864-1929). Resident botanist of San Diego, Calif., who explored northern Baja California. *Orcuttia*; *Aristida orcuttiana*; *Bromus orcuttianus*; *Eragrostis orcuttiana*.

Otis, Ira Clinton (1861-1938). Botanical collector of the State of Washington. *Glyceria otisii*.

Palmer, Edward (1831-1911). Naturalist-explorer, ethnobotanist, and collector in Paraguay, Mexico, and the southwestern United States, first naturalist to visit Guadalupe Island. *Agropyron smithii* var. *palmeri*; *Eragrostis palmeri*.

Parish, Samuel Bonsall (1838-1928). Resident botanist of San Bernardino, Calif., collector of local flora. *Agropyron parishii*; *Aristida parishii*; *Puccinellia parishii*.

Parry, Charles Christopher (1823-90). British-American "veteran botanist and tireless explorer," first with the Mexican Boundary Survey, later in Colorado, Utah, California, and Mexico. *Bouteloua parryi*; *Danthonia parryi*.

Patterson, Harry Norton (1853-1919). Illinois printer, resident botanist of Oquawka, who collected in Colorado. *Poa pattersoni*.

Phipps, Constantine John (1744-92). Second baron of Mulgrave, British naval commander, explorer, politician, leader of an unsuccessful Arctic expedition to discover a northern passage to India. *Phippsia*.

Pickering, Charles (1805-78). Botanist, ethnologist, historian, who accompanied the U. S. Exploring Expedition under Wilkes. *Calamagrostis pickeringii*.

Poiret, Jean Louis Marie (1755-1834). French botanist, who completed Lamarck's *Encyclopédie Méthodique*. Botanique. *Sporobolus poiretii*; *Setaria poiretiana*.

Porter, Thomas Conrad (1822-1901). Classicist, poet, professor of botany, Lafayette College, Pa., author of first Synopsis of Flora of Colorado. *Calamagrostis porteri*; *Melisa porteri*; *Muhlenbergia porteri*; *Stipa porteri*.

Prieur. See Leprieur.

Pringle, Cyrus Guernsey (1838-1911). Vermont botanist, pioneer plant breeder,

"prince of botanical collectors," who collected in Arizona and California and repeatedly visited Mexico through 26 years for plants. *Agropyron pringlei*; *Agrostis hallii* var. *pringlei*; *Poa pringlei*; *Stipa pringlei*.

Puccinelli, Benedetto (1808-50). Italian botanist, professor in Lyceum at Lucca. *Puccinellia*.

Pumpelly, Raphael (1837-1923). Geologist, U. S. Geological Survey. *Bromus pumpellianus*.

Pursh, Frederick (1774-1820). German-American botanist, collected in Middle Atlantic States, author of *Flora Americae Septentrionalis*, which first included discoveries of Lewis and Clark in the Pacific Northwest. *Amphicarpum purshii*.

Ravenel, Henry William (1814-87). Native of South Carolina, planter, agricultural editor, onetime botanist, South Carolina Department of Agriculture, who first issued published series of named specimens of American fungi. *Panicum ravenelii*.

Redfield, John Howard (1815-95). Philadelphia business man, long associated with Academy of Natural Sciences, amateur botanist. *Redfieldia*.

Reimarus, J. A. H. (1729-1814). German botanist, professor of Natural History and Physics at Hamburg. *Reimarochloa*.

Reverchon, Julien (1837-1905). Resident of Dallas, Tex., who came from Lyons, France, in 1856 and collected plants in Texas. *Muhlenbergia reverchoni*; *Panicum reverchoni*.

Reynaud, J. J. (1773-1842). Surgeon on French exploring vessel *Chevette*, who collected plants in the Orient. *Neyraudia*, an anagram of *Reynaudia*, a genus of West Indian grasses; *Neyraudia reynaudiana*.

Richardson, Sir John (1787-1865). English naturalist, author of *Fauna Boreali-Americana*, Arctic explorer, surgeon to three expeditions to the Arctic, the last in search of Sir John Franklin. *Stipa richardsoni*; *Muhlenbergia richardsonis*.

Roemer, Karl Ferdinand (von) (1818-91). German geologist, who collected plants in Texas, 1845-47. *Aristida roemeriana*.

Ross, Edith A. (fl. 1885-95). Amateur botanical collector of Davenport, Iowa, who visited Yellowstone Park in 1890. *Agrostis rossae*.

Rothrock, Joseph Trimble (1839-1922). Professor of botany, University of Pennsylvania, earlier surgeon-botanist to Wheeler's exploring expedition west of 100th meridian. *Bouteloua rothrockii*.

Rottboell, Christem Friss (1727-97). Danish botanist, professor of botany in Copenhagen. *Rottboellia*.

Roxburgh, William (1751-1815). Scotch botanist, who collected in India, Director of the botanical garden, Calcutta. *Sorghum vulgare* var. *roxburghii*.

Runyon, Robert (1881-). Photographer

and amateur botanist, Brownsville, Tex. *Digitaria runyonii*.

St. Hilaire, Auguste de (1779-1853). French botanist who traveled in Brazil and Paraguay for 6 years, 1816-22. *Hilaria*.

Saunders, William (1822-1900). Scotch-born horticulturist, first botanist and Superintendent of Horticulture, U. S. Department of Agriculture, instrumental in introduction of Bahia orange into California. *Agropyron saundersii*.

Scheele, Adolf (1808-64). German botanist, who described grasses from Texas. *Setaria scheelei*.

Schreber, Johann Christian Daniel (von) (1739-1810). German botanist, professor in Erlangen, who wrote on grasses. *Muhlenbergia schreberi*.

Scribner, Frank Lamson (1851-1938). Agrostologist, U. S. Department of Agriculture. *Scribneria*; *Agropyron scribneri*; *Calamagrostis scribneri*; *Panicum scribnerianum*; *Stipa scribneri*.

Sello (or Sellow), Friedrich (1789-1831). German botanist, who went to Brazil in 1814 and collected from Bahia on the north to Uruguay on the south. *Cortaderia selloana*.

Siegling, — (fl. ca. 1800). Professor of botany at Erfurt, Germany, associate of Johann Jakob Bernhardt. *Sieglingia*.

Silveus, William Arents (1875-). Agrostologist of San Antonio, Tex.; author of works on Texas grasses. *Eragrostis silveana*; *Sporobolus silveanus*.

Simpson, Joseph Herman (1841-1918). Resident naturalist of Florida. *Digitaria simpsoni*; *Eriochloa michauxii* var. *simpsoni*.

Smith, Charles Eastwick (1820-1900). Engineer, onetime railroad president, amateur botanist. *Melica smithii*.

Smith, Jared Gage (1866-). Onetime botanist, U. S. Department of Agriculture, later resident of Hawaii. *Agropyron smithii*.

Stapf, Otto (1857-1933). Botanist, Royal Botanic Gardens, Kew, England. *Neostapfia*.

Stillman, Jacob Davis Babcock (1819-88). Practicing physician of California, onetime coeditor of California Medical Gazette, amateur botanist. *Stipa stillmanii*.

Suksdorf, Wilhelm Nikolaus (1850-1932). Born in Dransau, Holstein, longtime resident of Bingen, Wash., pioneer collector in Klickitat County region. *Bromus suksdorfii*.

Swallen, Jason Richard (1903-). Agrostologist, U. S. Department of Agriculture; Curator, Division of Grasses, U. S. National Museum. *Eragrostis swalleni*; *Hilaria swalleni*.

Tharp, Benjamin Carroll (1885-). Professor of botany, University of Texas. *Sporobolus tharpii*.

Thurber, George (1821-90). New York botanist, agricultural editor, who wrote on grasses of California. *Agrostis thurberiana*; *Festuca thurberi*; *Muhlenbergia thurberi*; *Stipa thurberiana*.

Thurow, Friedrich Wilhelm (1852-1930).

German amateur botanist who came to Texas in 1876 and collaborated with Vasey in his study of Texas grasses. *Panicum thurrowii*.

Torrey, John (1796-1873). American botanist of distinction and physician of New York City. *Melica torreyana*; *Muhlenbergia torreyana*; *Muhlenbergia torreyi*.

Tracy, Joseph Prince (1879-). Business accountant of Eureka, Calif., amateur botanist and collector. *Festuca tracyi*.

Tracy, Samuel Mills (1847-1920). Agronomist and botanical collector of Biloxi, Miss., who collected in the Southern and Western States. *Andropogon tracyi*; *Eragrostis tracyi*; *Poa tracyi*.

Trinius, Karl Bernhard (1778-1844). Agrostologist of St. Petersburg, Russia, author of important works on grasses. *Bromus trinii*.

Tuckerman, Edward (1817-86). American lichenologist, professor of botany, Amherst College. *Panicum tuckermani*.

Tweedy, Frank (1854-1937). Topographic engineer, U. S. Geological Survey, who collected in Yellowstone Park and the Pacific Northwest. *Bromus pumpellianus* var. *tweedyi*; *Calamagrostis tweedyi*.

Urville. See Dumont-d'Urville.

Vasey, George (1822-93). Eminent American agrostologist; botanist, U. S. Department of Agriculture. *Vaseyochloa*; *Poa vaseyochloa*.

Walter, Thomas (1740-89). South Carolina planter, pioneer botanist, author of *Flora Caroliniana*. *Echinochloa walteri*.

Webber, David Gould (1809-). Physician, miner, miller, who went to California in 1849, onetime owner of Webber Lake, and friend of J. G. Lemmon. *Oryzopsis webberi*.

Webber, Herbert John (1865-1946). Botanist, U. S. Department of Agriculture, who early collected in Nebraska and Florida, was later devoted to citrus studies. *Panicum webberianum*.

Werner, William C. (1851-1935). Ohio florist and botanical collector. *Panicum werneri*.

Wilcox, Timothy Erastus (1840-1932). Surgeon, U. S. Army, "born naturalist," who collected in the Western States. *Panicum wilcoxianum*.

Williams, Thomas Albert (1865-1900). Agrostologist, U. S. Department of Agriculture. *Stipa williamsii*.

Willkomm, Heinrich Moritz (1821-95). German botanist, professor of botany and Director of gardens in Dorpat. *Willkommia*.

Wolf, John (1820-97). Botanist of Canton, Ill., who collected in Illinois and Colorado. *Poa wolfii*; *Trisetum wolfii*.

Wright, Charles (1811-85). Botanical explorer in Texas and New Mexico, with Mexican Boundary Survey, and later with North Pacific Ringgold Expedition, also visited Cuba and Santo Domingo. *Andropogon wrightii*; *Aristida wrightii*; *Muhlen-*

bergia wrightii; *Panicum wrightianum*; *Sporobolus wrightii*.

Zois, Karl von (1756-1800). German botanist. *Zoysia*.

GLOSSARY

Abortive. Imperfectly developed.

Acuminate. Gradually tapering to a sharp point. Compare *acute*.

Acute. Sharp-pointed, but less tapering than *acuminate*.

Aggregate. Collected together in tufts, groups, or bunches. Applied especially to inflorescences. The racemes are aggregate in several species of *Andropogon*.

Annual. Within 1 year. Applied to grasses which do not live more than 1 year.

Winter annual. A plant which germinates in the fall, lives over winter, and produces its seed the following spring, after which it dies.

Anthesis. The period during which a flower is open. In grasses, when the lemma and palea are expanded and the anthers and stigmas are mature.

Antrorse. Directed upwards or forwards. Applied especially to scabrous or pubescent stems, sheaths, awns, and so on. Opposed to *retorse*.

Apiculate. Having a minute pointed tip. Applied especially to fertile lemmas in fruit, such as certain species of *Eriochloa*.

Appressed. Lying against an organ. The branches of an inflorescence may be appressed to the main axis or the hairs on a stem may be appressed to the surface.

Aristate. Awned; provided with a bristle at the end or at the back or edge of an organ. In grasses applied especially to the awns at the end of the bracts of the spikelet. Compare *awn*. *Aristulate*. Bearing a short awn.

Articulate. Jointed. Joined by a line of demarcation between two parts which at maturity separate by a clean-cut scar. Certain spikelets are articulate with the pedicel; certain awns with the lemma. *Articulation*. The point of union of two articulate organs.

Ascending. Sloping upward. Applied to stems which curve upward from the base, to the branches of an inflorescence which slope upward at angle of about 40° to 70°, and to other parts such as blades and hairs. Compare *appressed* and *spreading*.

Attenuate. Gradually narrowed to a slender apex or base.

Auricle. An ear. Applied to earlike lobes at the base of blades and to the small lobes at the summit of the sheath in *Hordeae*.

Auriculate. Provided with ears.

Awn. A slender bristle at the end or on the back or edge of an organ. In grasses the awn is usually a continuation of the midnerve (sometimes also of the lateral nerves) of the glumes or lemmas, rarely of the palea.

Axil. The angle between an organ and its axis. Applied especially to the angle between a leaf and its stem and between a branch or pedicel and its axis. *Axillary*. Growing in an axil.

Axis. The main stem of an inflorescence, especially of a panicle. Compare *rachis*.

Barbed. Furnished with retrorse projections. Applied to the spines of *Cenchrus*.

Beak. A hard point or projection. Applied to seeds and fruits.

Bearded. Furnished with long stiff hairs, as the nodes of *Andropogon barbinodis*, the callus of *Stipa spartea*, the throat of the sheath of *Sporobolus cryptandrus*, and the main axils of the panicle of *Eragrostis spectabilis*.

Bifid. Two-cleft or two-lobed, applied to the summit of glumes, lemmas, and paleas. The lemmas of *Bromus* are usually bifid at apex.

Blade. The part of a leaf above the sheath.

Bract. The reduced leaves of the inflorescence and upper part of a shoot. Compare *scale*.

Branch. A lateral stem. Applied to the foliaceous stems or culms, and to the lateral stems of an inflorescence. *Branchlet*. A branch of the second or higher order. In open much-branched panicles the main branches from the axis are branches of the first order, the branchlets from these are branches of the second order and so on.

Bristle. A stiff slender appendage likened to a hog's bristle. An awn is a kind of bristle. In grasses the term is applied to the modified branchlets at the base of the spikelets in *Setaria* and allied genera, and to the prolongation of the rachis in *Panicum*, sect. *Paurochaetium*, and a few other groups.

Bulb. A subterranean bud with fleshy scales like the onion. The so-called bulbs of grasses are corms (which see). *Bulbous*. Swollen at base like a bulb or corm. Said of the base of the stem of some species of *Melica*, *Phleum*, *Phalaris*, and so on. *Bulblets*. Small bulbs or corms. Applied also to the proliferous buds in the inflorescence of certain grasses, as *Poa bulbosa*, proliferous forms of *P. arctica*, *P. alpina*, and others.

Callus. The indurate downward extension of the mature lemma in *Stipa*, *Aristida*, and some other genera. Morphologically, such a callus is a part of the rachilla. In *Heteropogon* and other *Andropogoneae* the callus is an oblique part of the rachis which extends downward from the spikelet. In *Chrysopogon* the callus is a part of the peduncle. The term callus is also applied to the thickened lower joint and first glume of *Eriochloa* (callus, a thickened part). *Callus hairs*. The hairs at the base of the floret of *Calamagrostis* and some other genera.

Canescent. Gray-pubescent or hairy.

Capillary. Very slender or hairlike.

Capitate. In a globular cluster or head.

Carinate. Keeled. Said of glumes, lemmas, and other parts when flattened laterally, with a sharp keel.

Cartilaginous. Hard and tough but elastic, like cartilage.

Caryopsis. The grain or fruit of grasses. The seed coat is grown fast to the pericarp as in the grain of wheat or corn. In a few grasses the seed is free within the pericarp, as in *Sporobolus* and *Eleusine*.

Cespitose. Tufted; several or many stems in a close tuft.

Chartaceous. Having the texture of writing paper.

Ciliate. Fringed with hairs on the margin (like an eyelash). *Ciliolate*. Minutely ciliate.

Circinate. Coiled from the top downward.

Clavate. Club-shaped; gradually thickened upward, and more or less circular in cross section.

Cleistogamous. Applied to flowers or florets when fertilized without opening. *Cleistogene*. A cleistogamous flower, such as found in *Triplasis* and *Danthonia*.

Collar. The area on the outer side of a leaf at the junction of sheath and blade.

Column. The lower undivided part of the awns of certain species of *Aristida*; the lower twisted segment of the awn in *Andropogoneae*.

Compact. Said of closely flowered inflorescences. Compare dense.

Compressed. Flattened laterally, as the compressed spikelets of *Uniola latifolia* and the compressed sheaths of *Andropogon virginicus*. If the organ is also sharply keeled, it is said to be compressed-keeled.

Conduplicate. Folded together lengthwise with the upper surface within, as in the blades of many grasses.

Continuous. Said of the rachis or other organ which does not disarticulate. The opposite of articulate or disarticulating.

Contracted. Said of inflorescences that are narrow or dense, the branches short or appressed. The opposite of open or spreading.

Convex. Rounded on the surface. Said especially of glumes and lemmas that are rounded on the back instead of keeled.

Convolute. Rolled longitudinally. Said mostly of blades, one edge being inside and the other outside.

Cordate. Heart-shaped. Said mostly of the base of blades. *Cordate-clasping*. Heart-shaped at base with the lobes overlapping around the stem.

Coriaceous. Leathery in texture.

Corm. The hard swollen base of a stem. In *Melica* the corm is a single enlarged lower internode. In *Panicum bulbosum* several internodes are involved. Compare *bulb*.

Crown. The persistent base of a tufted perennial herbaceous grass. Also the hard ring

or zone at the summit of some species of *Stipa*. The "pappuslike crown" of dissected teeth is mentioned under *Pappophorum*.

Culm. The jointed stem of grasses.

Cuneate. Wedge-shaped with the narrow part below.

Cuspidate. Tipped with a sharp short rigid point.

Deciduous. Falling away, as the awn of *Oryzopsis*, the spikelets of some species with articulate pedicels, and the blades of some bamboos. The opposite of persistent.

Decumbent. Curved upward from a horizontal or inclined base. Said of stems or culms.

Decurrent. Extending down an organ below the insertion. Said especially of ligules decurrent on the margins of the sheath.

Dehiscence. Spontaneous opening of an organ, as the opening of anthers to let out the pollen.

Dense. Said of inflorescences in which the spikelets are crowded. The opposite of open or loose. Compare *compact*.

Depauperate. Reduced or undeveloped. Said especially of impoverished or dwarfed plants below the average size.

Diffuse. Open and much-branched. Said of panicles.

Digitate. Several members arising from the summit of a support. Said especially of racemes or spikes from the summit of a peduncle, as in *Digitaria* and *Cynodon*.

Diocious. Unisexual, the two kinds of flowers on separate plants, as in *Buchloë*.

Disarticulating. Separating at maturity. Compare *articulate*.

Distichous. Conspicuously two-ranked, as the leaves of *Distichlis* and *Zea*.

Divaricate. Widely and stiffly divergent as the branches of certain open panicles (e.g., *Oryzopsis hymenoides*).

Dorsal. Relating to the back of an organ.

Dorsiventral. With a distinct upper and lower surface. Said of shoots bearing broad flat blades in a horizontal position, the blades turned into the same plane.

Drooping. Erect to spreading at base but inclining downward above, as the branches of a panicle.

Ellipsoid. An elliptic solid. Said of the shape of panicles, spikelets, and fruits.

Elliptic. Shaped like an ellipse. Said of blades and other flat surfaces.

Elongate. Narrow, the length many times the width or thickness.

Emarginate. Notched at the apex.

Equitant. Astride. Said of approximate compressed-keeled sheaths or blades at the base of a culm that infold each other like the leaves of *Iris*.

Erose. Irregularly notched at apex as if gnawed. Said of glumes and lemmas.

Excurrent. Running beyond. The midnerve is excurrent from the lemma as an awn in many grasses.

Exserted. Protruding. The awns of some

- species of *Calamagrostis* are exerted, protruding beyond the spikelet.
- Falcate*. Scimitar-shaped, curved sidewise and flat, tapering upward. Said of certain asymmetric blades.
- Fascicle*. A little bundle or cluster. Said of clustered leaves, branches of a panicle, and spikes or racemes on an axis.
- Ferruginous*. Rust-colored.
- Fertile*. Capable of producing fruit, having pistils. A fertile floret may be pistillate or perfect.
- Fibrillose*. Furnished with fibers. Said especially of the old basal sheaths of some grasses.
- Filiform*. Threadlike.
- Fimbriate*. Fringed, the hairs longer or coarser as compared with ciliate.
- Flabellate*. Fan-shaped. Said of the lemmas of *Neostaphia* and the inflorescence of *Miscanthus sinensis*.
- Flexuous*. Bent alternately in opposite directions.
- Floret*. The lemma and palea with included flower (stamens and pistil). Florets may be perfect, staminate, pistillate, neuter, sterile, and so on.
- Folded*. Conduplicate. Said chiefly of blades.
- Fruit*. The ripened pistil. In grasses the fruit is usually a caryopsis. The term fruit is also applied to the caryopsis and parts that may enclose it permanently at maturity. In *Panicum* the indurate fertile lemma and palea with the enclosed caryopsis is the fruit. In *Cenchrus* it is the entire bur.
- Fuscous*. Dusky, brownish gray.
- Fusiform*. Spindle-shaped. A solid that is terete in the middle and tapering toward each end.
- Geniculate*. Bent abruptly. Said of awns and of the lower nodes of the culm.
- Gibbous*. Swollen on one side, as the second glume of *Sacciolepis*.
- Glabrous*. Without hairs of any sort.
- Gland*. A protuberance or depression, usually minute, that secretes, or appears to secrete, a fluid. *Glandular*. Supplied with glands. The glands may be depressed as in *Eragrostis cilianensis* and *Heteropogon melanocarpus*.
- Glaucous*. Covered with a waxy coating that gives a blue-green color as in the leaf of the cabbage, and the bloom of the grape.
- Glomerate*. Collected in heads.
- Glumes*. The pair of bracts at the base of a spikelet.
- Gregarious*. Growing in groups or masses.
- Herbaceous*. Having the characters of an herb; opposed to woody; thin in texture and green in color, as the herbaceous lemmas of *Poa*.
- Hirsute*. Pubescent with straight rather stiff hairs. *Hirsutulous*, *hirtellous*. Minutely hirsute.
- Hispid*. Pubescent with stiff or rigid hairs. *Hispidulous*. Diminutive of hispid.
- Hyaline*. Thin and translucent or transparent.
- Imbricate*. Overlapping, as the lemmas in many spikelets.
- Implicate*. Tangled, as the branches of the panicle of *Panicum implicatum*.
- Indurate*. Hard. Compare chartaceous and coriaceous.
- Inflated*. Puffed up, bladdery.
- Inflexed*. Turned in at the margins. Said especially of the margin of the glumes or lemmas in some species.
- Inflorescence*. The flowering part of a plant.
- Innovation*. The basal shoot of a perennial grass.
- Internerves*. The spaces between the nerves. Said of glumes and lemmas.
- Internode*. The part of a stem between two successive nodes.
- Interrupted*. The continuity broken. Said especially of dense inflorescences whose continuity is broken by gaps.
- Involucre*. A circle of bracts below a flower or flower cluster. In grasses applied to the cluster of bristles or sterile branchlets below the spikelets in *Pennisetum* and a few other genera, and to the bony bead of *Coix*.
- Involute*. Rolled inward from the edges, the upper surface within. Said of blades.
- Joint*. The node of a grass culm. The internode of an articulate rachis.
- Keel*. The sharp fold at the back of a compressed sheath, blade, glume, or lemma. The palea and sometimes the glumes and lemmas may be two-keeled. Keel is used because of the similarity to the keel of a boat.
- Lacerate*. Torn at the edge or irregularly cleft, as in some ligules.
- Lanate*. Woolly, clothed with long tangled hairs.
- Lanceolate*. Rather narrow (surface), tapering to both ends, the broadest part below the middle.
- Laterally* (compressed). Flattened from the sides, as certain spikelets, glumes, and lemmas.
- Lax*. Loose. Said of a soft or open inflorescence and of soft or drooping foliage.
- Leaf*. The lateral organ of a stem, in grasses consisting of sheath and blade.
- Lemma*. The bract of a spikelet above the pair of glumes.
- Ligule*. The thin appendage or ring of hairs on the inside of a leaf at the junction of sheath and blade.
- Linear*. Long and narrow with parallel sides. Said of surfaces, such as a blade. Said also of spikelets and other organs, having in mind the shape of a longitudinal section.
- Lobe*. A segment of an organ, usually rounded or obtuse. Applied especially to the divisions of a cleft lemma.
- Loose*. Open. Said of panicles. The opposite of dense or compact.
- Membranaceous*. Thin, like a membrane.

Monoecious. Unisexual, the two kinds of flowers on the same plant, as in *Zea* and *Zizania*.

Mucro. A minute awn or excurrent midnerve of an organ. **Mucronate.** Provided with a mucro.

Navicular. Boat-shaped. Shaped like the bow of a canoe. Applied especially to the tip of blades.

Nerve. The vascular veins (mostly longitudinal) of the blades, glumes, and lemmas.

Neuter. Without stamens or pistils. Said of florets or spikelets.

Nodding. Inclined somewhat from the vertical. Said of panicles.

Node. The joint of a culm.

Nodulose. Roughened by minute knots.

Ob-. A prefix meaning inversely, as obovate.

Oblong. Longer than wide, with parallel sides, but not so long as linear. Applied also to panicles and other parts, having in mind a longitudinal section.

Obsolete. Almost wanting. Applied to organs usually present.

Obtuse. Rounded at the apex. Contrasted with acute.

Open. Loose. Said of panicles. Opposite of dense or compact.

Oval. Broadly elliptic.

Ovate. The shape of the longitudinal section of an egg, broadest below the middle.

Ovoid. An egg-shaped solid.

Palea. The inner bract of a floret.

Panicle. An inflorescence with a main axis and subdivided branches. It may be compact and spikelike (*Phleum pratense*) or open (*Avena sativa*).

Papery. See chartaceous.

Papilla. A minute nipple-shaped projection.

Papillose. Bearing papillae. **Papillose-pilose.** Bearing stiff hairs arising from papillae.

Pappus. In grasses mentioned under *Pappophorum*, referring to the awns as forming a pappuslike crown, similar to the pappus in certain species of *Compositae*.

Pectinate. Comblike. Used especially with some species of *Bouteloua* where the spikelets are set close together, parallel and divergent from the rachis like the teeth of a comb.

Pedicel. The stalk of a spikelet. **Pedicellate.** Having a pedicel. Opposed to sessile.

Peduncle. The stalk or stem of an inflorescence. **Peduncled.** Having a peduncle.

Pendent. Hanging down.

Perennial. Lasting more than 1 year. Applied to grasses in which the underground parts last more than 1 year; and to woody culms to distinguish them from those which die to the ground (herbaceous) even though the underground parts are perennial.

Perfect. Applied to flowers having both stamens and pistil.

Pericarp. The ripened walls of the ovary when it becomes a fruit.

Persistent. Remaining attached, either after

other parts have been shed, or for a considerable period. The paleas of certain species of *Eragrostis* persist after the fall of the lemmas. Also used as the opposite of deciduous.

Petiole. The stalk of a leaf blade. Used with the leaves of many bamboos and with some other broadleaved species in which the blade contracts into a petiole. **Petiolate.** Having a petiole.

Pilose. Pubescent with soft straight hairs.

Pistillate. Applied to flowers bearing pistils only and to an inflorescence or a plant with pistillate flowers.

Pitted. Marked with small depressions or pits. Applied to the fruit (fertile lemma) of certain species of *Olyra*. Also applied to the pinhole depression in the glume of certain species of *Andropogoneae*.

Plicate. Folded in plaits lengthwise as the blades of *Setaria* sect. *Ptycophyllum*.

Plumbeous. Lead-colored, greenish drab, as the spikelets of *Eragrostis cilianensis*.

Plumose. Feathered, having fine hairs on each side. Said chiefly of awns and slender teeth.

Proliferous. Bearing vegetative buds or bulblets in the inflorescence. Compare *bulblets*.

Pruinose. Having a waxy powdery secretion on the surface. Having a more pronounced bloom than when glaucous.

Puberulent. Diminutive of pubescent. Minutely pubescent.

Pubescent. Covered with hairs. Applied especially when the hairs are short and soft. **Pubescence.** A hairy covering.

Pulvinus. The swelling at the base of the branches of some panicles which cause them to spread.

Pustulose. Blistery, furnished with pustules or irregularly raised pimples, as in the spikelets of *Panicum angustifolium*. Not as definitely roughened as papillose.

Pyramidal. Pyramid-shaped. Applied sometimes to panicles that are actually conical.

Pyriform. Pear-shaped. Obovoid with attenuate base. Applied to the shape of spikelets.

Raceme. An inflorescence in which the spikelets are pediceled on a rachis. **Racemose.** In racemes.

Rachilla. A small rachis. Applied especially to the axis of a spikelet.

Rachis. The axis of a spike or raceme.

Reticulate. In a network. Applied especially to the cross-veining on some spikelets, as *Panicum fasciculatum*.

Retrorse. Pointing backward, as the hairs on the sheaths of certain species of *Bromus*.

Revolute. Turned or rolled backward from both edges. Said chiefly of blades.

Rhizome. An underground stem; rootstock. The rhizomes of grasses are usually slender and creeping. They bear scales at the nodes, the scales sometimes remote and inconspicuous (*Poa pratensis*), sometimes imbricate and prominent (*Spartina*).

- Rhizomatous*. Having rhizomes or appearing like rhizomes, as the base of a decumbent stem.
- Rosette*. A cluster of spreading or radiating basal leaves, as in the overwintering stage of *Panicum*, sect. *Dichanthelium*.
- Rudiment*. An imperfectly developed organ or part. *Rudimentary*. Underdeveloped. Applied also to one or more rudimentary florets at the summit of the spikelet of some genera, as *Melica*, *Bouteloua*, *Chloris*.
- Rugose*. Wrinkled. Said especially of the fruit of some species of *Panicum* and allied groups.
- Saccate*. Bag or sac-shaped, as the second glume of *Sacciolepis*.
- Scabrous*. Rough to the touch. Covered with minute points, teeth, or very short stiff hairs. *Scaberulous*. Minutely scabrous.
- Scale*. The reduced leaves at the base of a shoot. Said especially of the reduced or rudimentary leaves on a rhizome.
- Scarious*. Thin, dry, and membranaceous, not green.
- Secondary*. Subordinate; below or less than primary. Said of branches arising from primary branches.
- Secund*. One-sided or arranged along one side.
- Self-pollinated*. Pollinated in the bud or by pollen from the same flower. The opposite of cross-pollinated.
- Serrate*. Saw-toothed; having sharp teeth. *Serrulate*. Minutely serrate.
- Sessile*. Without a pedicel or stalk. The opposite of pediceled. Said of blades, spikelets, and other organs.
- Setaceous*. Bristlelike. Said especially of slender teeth attenuate to an awn.
- Sheath*. The lower part of a leaf that encloses the stem.
- Sinuous*. Wavy.
- Smooth*. Not rough to the touch. Compare glabrous, without hairs but which may be rough to the touch.
- Spathe*. A sheathing bract of the inflorescence found especially in the Andropogoneae.
- Spike*. An unbranched inflorescence in which the spikelets are sessile on a rachis. *Spike-like*. A dense panicle in which the pedicels and branches are short and hidden by the spikelets as in *Phleum*.
- Spikelet*. The unit of the inflorescence in grasses, consisting of two glumes and one or more florets.
- Spreading*. Having an outward direction. Said especially of the branches of a panicle when they lie between ascending and the horizontal direction (right angles).
- Squarrose*. Spreading or recurved at the tip. Said of the tips of lemmas.
- Stamen*. The part of the flower that bears the pollen. *Staminate*. Containing stamens only. Also applied to an inflorescence or a plant with staminate flowers.
- Sterile*. Without pistils. A sterile floret may be staminate or neuter. It may even lack a palea, and consist of nothing but a lemma.
- Stipe*. A minute stalk to an organ. Applied especially to a pistil. Also sometimes to the prolongation of a rachilla as in *Calamagrostis*. *Stipitate*. Having a stipe.
- Stolon*. A modified propagating stem above ground creeping and rooting or curved over and rooting at the tip. *Stoloniferous*. Bearing stolons.
- Stramineous*. Straw-colored, pale yellow.
- Striate*. Marked with fine parallel lines or minute ridges.
- Strict*. Stiffly upright.
- Strigose*. Rough with short stiff hairs; harshly pubescent.
- Sub-*. A prefix to denote somewhat, slightly, or in a less degree; as subacute, somewhat acute.
- Subtend*. To be below, as a bract subtends a branch in its axil.
- Subulate*. Awl-shaped.
- Succulent*. Fleshy or juicy.
- Sulcate*. Grooved or furrowed. Said chiefly of stems, sheaths, and slender blades.
- Tawny*. Pale brown or dirty yellow.
- Teeth*. Pointed lobes or divisions.
- Terete*. Cylindric and slender, as the usual unflattened stems or culms of grasses.
- Tessellate*. The surface marked with square or oblong depressions.
- Triad*. A group of 3, applied to the central and 2 lateral spikelets in *Hordeum* and to ultimate racemes in *Sorghum*.
- Trifid*. Divided into three parts as the awns of *Aristida*.
- Truncate*. Ending abruptly, as if cut off horizontally.
- Tuberculate*. Furnished with small projections.
- Turgid*. Swollen, as the pulvini of a panicle during anthesis.
- Unilateral*. One-sided or turned to one side.
- Unisexual*. Said of flowers containing only stamens or only pistils.
- Verticillate*. In verticils or whorls.
- Villous*. Pubescent with long soft hairs.
- Virgate*. Straight and erect; wand-shaped.
- Web*. The cluster of slender soft hairs at the base of the floret in certain species of *Poa*.
- Whorl*. A cluster of several branches around the axis of an inflorescence.
- Wing*. A thin projection or border; for example, the thin borders on the rachis of certain species of *Digitaria* and *Paspalum*.

APPENDIX

The following genera are additions to or changes from the genera in the first edition of the Manual, and which are not in Hitchcock's *Genera of Grasses of the United States* (United States Department of Agriculture Bulletin 772, revised edition, 1936.) The place of publication and the type species are here given, the descriptions being given in the text.

PHYLLOSTACHYS Sieb. and Zucc.

Type species: *Phyllostachys bambusoides* Sieb. and Zucc.

Phyllostachys Sieb. and Zucc., Abh. Bayer. Akad. Wiss. 3³: 745, pl. 5. 1843. A single species included, *Phyllostachys bambusoides* Sieb. and Zucc.

A large genus of Asiatic bamboos.

PSEUDOSASA Makino

Type species: *Pseudosasa japonica* (Sieb. and Zucc.) Makino.

Pseudosasa Makino, Jour. Jap. Bot. 2⁴: 15. 1920. No generic description. "The diagnosis will appear in the foregoing number." Three species are transferred to the genus, the first being *Pseudosasa japonica* (Sieb. and Zucc.) Makino. The diagnosis was published in English by Makino, Jour. Jap. Bot. 5⁴: 15. 1928, *P. japonica* (Sieb. and Zucc.) Makino being one of the seven species included.

(3) BRACHYPODIUM Beauv.

Type species: *Brachypodium pinnatum* (L.) Beauv.

Brachypodium Beauv., Ess. Agrost. 100, pl. 19, f. 3. 1812. Twenty-two names are listed under the genus, several of them not congeneric with *B. pinnatum*, based on *Bromus pinnatus* L., which is taken as the type because it is the only one illustrated.

Trachynia Link, Hort. Berol. 1: 42. 1827. Two species are included, *Trachynia distachya* (L.) Link, based on *Bromus distachyos* L., and *T. rigida* (Roth) Link, based on *Festuca rigida* Roth, differentiated from *Brachypodium* on glumes longer than the lower floret.

Perennials or annuals with racemes of subsessile, many-flowered spikelets. Several species in Eurasia and Africa, one native of Mexico and Central America, and a few introduced in North and South America.

(9) SCOLOCHLOA Link

(*Fluminea* Fries)

Type species: *Scolochloa festuacea* (Willd.) Link.

Scolochloa Link, Hort. Berol. 1: 136. 1827; not *Scolochloa* Mert. and Koch, 1823. A single species included, *Scolochloa festuacea* (Willd.) Link, based on *Arundo festuacea* Willd.

Fluminea Fries, Summa Veg. Scand. 247. 1846. Based on *Festuca borealis* Mert. and Koch. A single species included, its name being given as "*Festuca borealis* or *Fluminea arundinacea*." This is the same as *Scolochloa festuacea*.

The genus consists of a single marsh grass of Eurasia, Canada, and northern United States.

(11) HESPEROCHLOA (Piper) Rydb.

Type species: *Festuca confinis* Vasey (*F. kingii* Cassidy).

Festuca subgenus *Hesperochloa* Piper, U. S. Nat. Herb. Contrib. 10: 40, pl. 15. 1906. A single species is included, *F. confinis* Vasey (*Hesperochloa kingii* (S. Wats.) Rydb.).

Hesperochloa (Piper) Rydb., Torrey Bot. Club Bul. 39: 106. 1912. Based on *Festuca* subgenus *Hesperochloa* Piper.

Wasatchia Jones, West. Bot. Contrib. 14: 16. 1912. A single species is included, *W. kingii* (S. Wats.) Jones.

The genus consists of a single dioecious species of the Western States.

(32 A.) ECTOSPÉRMA Swallen

Spikelets several-flowered, glumes and lemmas persistent on the continuous short-jointed rachilla, the caryopsis falling free; glumes subequal, about reaching the summit of the spikelet, broad, spreading, 7- to 11-nerved; lemmas rounded on the back, closely imbricate, thin, 5- to 7-nerved, densely long villous on the margins in the lower half to two-thirds; palea as long as the lemma or slightly exceeding it, the broad margins densely long villous nearly to the summit, the apex more or less erose or lacerate; caryopsis readily falling from the floret, broadly elliptic, the embryo broad, about two-thirds the length of the grain; stamens 3. Rigid perennial with firm pungent blades and narrow, simple panicles of broad spikelets. Only known from the type species, *Ectosperma alexandrae*. Name from *ectos*, free from, and *sperma*, seed.

1. *Ectosperma alexandrae* Swallen. (Fig. 1200.) Rigid perennial, branching at base from an erect or creeping thick scaly rhizome with woolly nodes; flowering culms erect or ascending, 30 to 35 cm. tall, sulcate-ridged, puberulent at the summit, otherwise glabrous; leaves 2 or 3 above the base, distant, the sheaths much shorter than the internodes, the uppermost about reaching the base of the panicle, villous on the margin toward the summit; ligule a ring of hairs about 1 mm. long; blades rigid, 5 to 9 cm. long, 3 to 5 mm. wide, tapering to a pungent apex, the upper 2 blades subulate; leaves of the few to several stout erect sterile branches at base numerous, the sheaths much overlapping, long-villous on the margin and densely so at the summit; blades conspicuously distichous, rigid, 4 to 14, mostly 5 to 7 cm., long (the lower shorter), 3 to 6 mm. wide, tapering to a pungent apex; panicle erect or nearly so, simple, 6 to 10 cm. long, the axis and few, short, 2- to 3-flowered branches compressed, sparsely pubescent; spikelets on short, pubescent pedicels, scarcely imbricate, palea, 1 to 1.5 cm. long, nearly as wide; rachilla compressed, bearded at the nodes; glumes 9 to



FIGURE 1200.—*Ectosperma alexandrae*. Plant $\times \frac{1}{2}$; glumes, dorsal view of lemma, ventral view of palea with lodicules, stamens, and pistil, and two views of caryopsis, $\times 5$. (Type.)

14 mm. long, acuminate, glabrous; [the lemmas 7 to 9 mm. long, apiculate, the margins conspicuously white-villous except the apex; palea deeply sulcate between the arched keels, the margins conspicuously white-villous; caryopsis readily falling, brown, 4 mm. long, 2 mm. wide, the embryo conspicuous; anthers 3.5 mm. long, pale. 2 — Sand hill, altitude 3,050 feet, Eureka Valley, Inyo County, Calif.

(33) TRIDENS Roem. and Schult.

Type species: *Tridens quinquefidus* (Pursh) Roem. and Schult. (*Tridens flavus* (L.) Hitchc.)

Tricusps Beauv., Ess. Agrost. 77, pl. 15, f. 10. 1812. Not *Tricusps* Pers., 1807. *Tricusps caroliniana* Beauv., the species illustrated, is taken as the type. This is *Tridens flavus* (L.) Hitchc. Two other names mentioned are nomina nuda.

Tridens Roem. and Schult., Syst. Veg. 2: 34, 599. 1817; *Tricusps* Beauv., pl. 15, f. 10 is cited on page 34, and *Tridens quinquefida* Roem. and Schult., based on *Poa quinquefida* Pursh, is published on page 599.

Windsoria Nutt., Gen. Pl. 1: 70. 1818. Two species are described, *W. poaeformis* Nutt., which is *Tridens flavus*, and *W. ambiguus* (Ell.) Nutt. The first is selected as the type.

Erioneuron Nash in Small, Fl. Southeast. U. S. 143. 1903. The type, *Uralepis pilosa* Buckl. (*Tridens pilosus* (Buckl.) Hitchc.), is indicated on page 1327. Only one species is included.

Dasyochloa Willd. ex Rydb., Colo. Agr. Expt. Sta. Bul. 100: 18, 37. 1906. There is no description except in the key. *Dasyochloa pulchella* Willd. is listed in Steud. Nom. Bot. ed. 2. 1: 484. 1840, as synonym of *Uralepis* ("Uralepsis") *pulchella* Kunth (*Tridens pulchellus* (H. B. K.) Hitchc.) and is the only species included in the genus by Rydberg.

Perennials, diverse in habit and spikelets, which have been included in *Triodia* R. Br., of Australia and New Zealand, which also consists of species with somewhat diverse spikelets. *Tridens* differs from that in the strictly 3-nerved lemmas, the lateral nerves marginal or nearly so, the lemmas of *Triodia* being mostly in 3 groups of 2 or 3 nerves each (sometimes indistinct), the lateral nerves not marginal.

In habit the species of *Triodia* are very different from those of *Tridens*, being tussock grasses with rigid pungently pointed blades. *Tridens* is confined to the western hemisphere. Two new combinations are necessary, see pages 971, 973.

(35) NEOSTAPFIA Davy

Type species: *Stapfia colusana* Davy.

Stapfia Davy, Erythea 6: 110, pl. 3. 1898. Not *Stapfia* Chodat, 1897. A single species included, *Stapfia colusana* Davy.

Neostapfia Davy, Erythea 7: 43. 1899. Change of name for *Stapfia*, the species renamed *Neostapfia colusana* (Davy) Davy.

Davyella Hack., Oesterr. Bot. Zeitschr. 49: 133. 1899. Change of name for *Stapfia* Davy, the species renamed *Davyella colusana* (Davy) Hack.

The one species, confined to California, was included in the related South American genus, *Anthochloa* Nees, by Scribner (U. S. Dept. Agr., Div. Agrost. Bul. 17: 221, f. 517. 1899). In *Anthochloa* the leaves are differentiated into sheath and blade as in other grasses, the axis of the inflorescence is not extended and foliaceous as in *Neostapfia*, and the glumes are developed and persistent. (See R. F. Hoover, West. Bot. Leaflets 11: 274. 1940.)

(40) ENNEAPOGON Desv.

Type species: *Enneapogon desvauxii* Beauv.

Enneapogon Desv. ex Beauv., Ess. Agrost. 81, pl. 16, f. 11. 1812. *Enneapogon desvauxii* Beauv. and four species described by Robert Brown under *Pappophorum* are included, *E. desvauxii* being the only one illustrated. No locality is here given, but in a later paper by Desvaux. (Jour. de Bot. 1: 70. 1813.) "îles Manilles" was erroneously given for the locality. What is undoubtedly part of the type collection was recently found in the British Museum and proves to be the American species known as *Pappophorum wrightii* S. Wats., with which Beauvois' illustration agrees. The collection was probably made by Née near Mendoza, Argentina, where the species is still found. See Burbidge, N. T., Linn. Soc. London Proc. 153 Sess. (1940-41): 52-91, f. 1-5. 1941; also Chase, A., Madroño 8: 187-189. 1946.

Tufted perennials of subarid regions of Asia, Africa and Australia, one species in America.

(51) MONERMA Beauv.

Type species: *Monerma monandra* Beauv.

Monerma Beauv., Ess. Agrost. 116, pl. 20, f. 10. 1812. Three names are listed. *Monerma monandra* Beauv., the species illustrated, is taken as the type. This is the same as *M. cylindrica* (Willd.) Coss. and Dur. (See p. 898.) This species has commonly been included in *Lepturus* R. Br., the type of which is *L. repens* (G. Forst.) R. Br. of Australia and the Pacific islands. *Monerma* consists of a single species of the Mediterranean region, introduced in America.

(52) PARAPHOLIS C. E. Hubbard

Type species: *Parapholis incurva* (L.) C. E. Hubbard, based on *Aegilops incurva* L.

Parapholis C. E. Hubb., Blumea Sup. 3 (Henrard Jubilee vol.): 14. 1946. Differentiated from *Pholiurus*, to which the four

species included had been referred. *Pholiurus* Trin. is based on a single species, *P. pannonicus* (Host) Trin., in which the rachis is continuous, the spikelets falling alone at maturity (as in *Scribneria*).

Low annuals with slender cylindric spikes. Species 4, in the Eastern Hemisphere, one introduced in the United States.

(60) CORYNEPHORUS Beauv.

Type species: *Corynephorus canescens* (L.) Beauv.

Weingaertneria Bernh., Syst. Verz. Pflanz. 23: 51. 1800. A single species, *W. canescens* (L.) Bernh., based on *Aira canescens* L., is included.

Corynephorus Beauv., Ess. Agrost. 190. 1812. Two species are included, *C. articulatus* (Desf.) Beauv., based on *Aira articulata* "Lin." (error for Desf.) and *C. canescens* (L.) Beauv., based on *Aira canescens* L. The latter species, being illustrated, is taken as the type.

(62) HELICTOTRICHON Besser

Type species: *Avena sempervirens* Host.

Helictotrichon Bess. ex Andrzej., Rys. Bot. 9. 1823. Undescribed; *E. sempervirens* Bess., presumably based on *Avena sempervirens* Host, is included in a list of plants.

Helictotrichon Bess. in Schult., Mantissa 3. (Add. 1): 526 (error 326). 1827. A generic description is given and five species listed, "*Av. sempervirens* Host, *versicolor* Vill., *pratensis* L., *pubescens* L., *planiculmis* Schrad." None are here transferred to *Helictotrichon*, but all have been transferred in recent years. In Schur, Enum. Pl. Transsilv. 762. 1866, the name is misspelled "*Heliotrichum*."

Avena sect. *Avenastrum* Koch, Syn. Fl. Germ. Helv. 795. 1837. Six species are included, *A. planiculmis* Schrad., *A. pubescens* Huds., *A. alpina* J. E. Smith, *A. pratensis* L., *A. versicolor* Vill., and *A. sempervirens* Vill., all European and all later transferred to *Helictotrichon*.

Avenastrum Jessen, Deutschl. Gräser 214. 1863. Presumably based on *Avena*, sect. *Avenastrum*, but Koch is not mentioned except in the list of authors (p. 297). Besides 2 species included by Koch, *A. pubescens* and *A. pratense*, Jessen transferred one species of *Trisetum*, one of *Arrhenatherum*, and two of *Aira* to his *Avenastrum*.

Heuffelia Schur, Enum. Pl. Transsilv. 760. 1866. "*Avena* sect. II. *Avenastrum* Koch" is cited and 12 species listed.

Numerous perennials of Eurasia and Africa, one introduced and two native in western North America.

(65) SIEGLINGIA Bernh.

Type species: *Sieglingia decumbens* (L.) Bernh.

Sieglingia Bernh., Syst. Verz. Erf. 20, 44. 1800. A single species is included, *Sieglingia decumbens* (L.) Bernh., based on *Festuca decumbens* L.

The genus consists of a single tufted perennial of Europe and British America, recently found in northern Washington.

(70) APERA Adans.

Type species: *Agrostis spica-venti* L.

Apera Adans., Fam. Pl. 2: 495. 1763. "*Agrostis* 1. Lin. Sp. 61" is cited. The first species of *Agrostis* in Linnaeus, Species Plantarum, is "*A. spica venti*."

Anemagrostis Trin., Fund. Agrost. 128. 1820. Two species, *Agrostis spica-venti* L. and *A. interrupta* L., are included.

The genus consists of two annuals of Eurasia, both introduced in the United States. Previously included in *Agrostis*.

(86) HELEOCHLOA Host ex Roemer

Type species: *Heleochloa alopecuroides* (Pill. and Mitterp.) Host.

Heleochloa Host ex Roemer, Collect. Rem. Bot. 233. 1809. Generic description given for *Heleochloa* Host, Icon. Gram. Austr. 1: 23. pl. 29. 1801, including *H. alopecuroides* (Pill. and Mitterp.) Host and *H. schoenoides* (L.) Host, described and figured by Host but without generic description. Roemer includes the same species.

(102) MICROCHLOA R. Br.

Type species: *Microchloa setacea* (Roxb.) R. Br.

Microchloa R. Br., Prodr. Fl. Nov. Holl. 208. 1810. A single species is included, *Microchloa setacea* (Roxb.) R. Br., based on *Rottboellia setacea* Roxb.

Wiry annuals or perennials with slender curved spikes. Several species in Africa and Australia, one introduced and one native in America.

EHRHARTA Thunb.

Type species: *Ehrharta capensis* Thunb.

Ehrharta Thunb., Svensk. Vet. Akad. Handl. 40: 217, pl. 8. 1779. A single species is included, *Ehrharta capensis* Thunb., of South Africa.

Trochera L. C. Rich., Jour. de Phys. (Obs. Phys.) 13: 225, pl. 3. 1779. A single species is included, *Trochera striata* L. C. Rich., a garden plant from unknown source, referred by Stapf to *Ehrharta bulbosa* Smith. Though the title-page date is the same, Kuntze (Rev. Gen. Pl. 2: 795. 1891) gives March for month of publication for *Trochera* and July-September for *Ehrharta*.

Placed in *Phalarideae*, having a pair of sterile lemmas below the single fertile floret, the sterile lemmas exceeding the glumes and usually the fertile floret. Species numerous

in South Africa, a few introduced elsewhere, two in California.

(142) RHYNCHELYTHRUM Nees

Type species: *Rhynchelythrum dregeanum* Nees (*R. repens* (Willd.) C. E. Hubbard).

Rhynchelythrum Nees in Lindl., Nat. Syst. Bot. 446. 1836. A single species, *R. dregeanum* from Cape of Good Hope, is included. (Nees corrected the spelling to *Rhynchelythrum* in Errata, following page 490 in Nees, Agrostographia, 1841.) There are some 40 species in Africa, southern Europe, and southern Asia, one species, *R. repens* (Willd.) C. E. Hubbard, widely introduced in the warmer parts of America and commonly known as Natal grass. Most of the species were formerly included in *Tricholaena* Schrad., the type species of which is *T. micrantha* Schrad. (*T. teneriffae* (L.f.) Link, based on *Saccharum teneriffae* L.f.) In his 1836 publication Nees gives "C. b. Sp." (Cape bonae Spei) as the locality for *Rhynchelythrum dregeanum*, but in his Agrostographia Capensis 64. 1841, Nees, repeating the earlier generic description almost verbatim and describing the species in detail, gives as locality "In loco depresso humido ad Port Natal vix 100' [pedales] alt., (Drège)." Port Natal is now known as Durban, but Nees seems to have included the south African regions explored by Drège under the general name of colonia Capensis, or Capstadt.

In the Agrostographia Capensis, pages 16-20, Nees includes *Tricholaena* Schrad., with four species, *T. tonsa* Nees and *T. rosea* Nees, which have the characters of *Rhynchelythrum*, and *T. capensis* (Licht.) Nees and *T. arenaria* Nees, with the characters now restricted to *Tricholaena*.

Perennials or annuals, the panicles with capillary branchlets and pedicels and silky, often reddish, spikelets.

(152) MICROSTEGIUM Nees

Type species: *Microstegium willdenovianum* Nees.

Microstegium Nees in Lindl., Nat. Syst. 447. 1836. A single species is included, *M. willdenovianum* Nees, which is the same as *M. vimineum* (Trin.) A. Camus, based on *Andropogon vimineus* Trin.

Leptatherum Nees, Proc. Linn. Soc. 1: 92. 1841. A single species is included, *L. royleanum* Nees, which is the same as *Microstegium nudum* (Trin.) A. Camus, based on *Pollinia nuda* Trin.

Nemastachys Steud., Syn. Pl. Glum. 1: 357. 1854. A single species is included, *N. taitensis* Steud., which is the same as *Microstegium glabratum* (Brongn.) A. Camus, based on *Eulalia glabrata* Brongn.

Mostly decumbent species with lanceolate blades and digitate racemes, numerous in southern Asia and East Indies, several species in the Pacific Islands, and a few in Africa, one introduced in eastern United States.

(158) CHRYSOPOGON Trin.

Type species: *Chrysopogon gryllus* (L.) Trin. *Rhaphis* Lour., Fl. Cochinch. 552. 1790.

A single species, *Rhaphis trivialis* Lour., which is the same as *Andropogon aciculatus* Retz. (*Rhaphis aciculatus* (Retz.) Desv.) and *Chrysopogon aciculatus* (Retz.) Trin. is included.

Pollinia Spreng., Pugill. 2: 10. 1815. Not *Pollinia* Trin., 1832. Several species are described, but the generic characters are given under the first, *P. gryllus* Spreng., based on *Andropogon gryllus* L.

Centrophorum Trin., Fund. Agrost. 106, pl. 5. 1820. A single species, *C. chinense*, is included. This is the same as *Chrysopogon aciculatus* (Retz.) Trin.

Chrysopogon Trin., Fund. Agrost. 187. 1820. Two species are included, *C. gryllus* (L.) Trin. and *C. aciculatus* (Retz.) Trin. An illustration of the first is cited and that species is taken as the type.

Chrysopogon sect. *Rhaphis* (Lour.) Ohwi, Acta Phytotax. and Geobot. 11: 163. 1942. Based on *Rhaphis* Lour.

Bentham (Linn. Soc. Jour., Bot. 19: 73. 1881) transferred the American species, *Andropogon nutans*, *A. avenaceus*, and allied species, to *Chrysopogon* Trin., and that name was adopted by Vasey and others until *Sorghastrum* Nash was described for these species.

Awned perennials of Eurasia, Africa, and the Pacific islands. Only one annual species, *C. pauciflorus* (Chapm.) Benth., known from America.

VETIVERIA Bory

Type species: *Vetiveria odoratissima* Bory. (*V. zizanioides* (L.) Nash.)

Vetiveria Bory in Lem., Bul. Soc. Philom. (Paris) 1822: 43. 1822. A single species, *V. odoratissima* Bory, mentioned in an account of the rhizome, and *Agrostis verticillata* Lam. are cited, both the same as *V. zizanioides* (L.) Nash, based on *Phalaris zizanioides* L. The species is described under the name *Vetiveria odorata* Virey in Dupetit-Thouars ex Virey, Jour. de Pharm. I. 13: 501. 1827, the preceding paper cited.

Mandelorna Steud., Syn. Pl. Glum. 1: 359. 1854. A single species included, *M. insignis* Steud., the same as *Vetiveria nigritana* (Benth.) Stapf, a species closely allied to *V. zizanioides*.

Tall perennials of the Old World, one species introduced in America.

THEMEDA Forsk.

Type species: *Themeda triandra* Forsk.

Themeda Forsk., Fl. Aegypt. Arab. 178. 1775. A single species included, *Themeda triandra* Forsk.

Anthistiria L. f., Nov. Gram. Gen. 38, pl. 1. 1779. The genus is described and figured, but no species is mentioned; L. f., Suppl. Pl. 113. 1781. A single species described, *Anthistiria ciliata* L. f., "*Andropogon quadrivalvis* [L.] Syst. Veg. ed. 13. p. 758" cited.

Androscepia Brongn. in Duperrey, Bot. Voy. Coquille 77. 1831. A single species included, *A. gigantea* (Cav.) Brongn., based on *Anthistiria gigantea* Cav. (*Themeda gigantea* (Cav.) Hack.

Annuals or robust perennials of the Old World, one species introduced in the United States and two in the West Indies.

Names published by Johann Friedrich Theodor Bieler in his doctor's thesis entitled, "Plantarum Novarum ex Herbario Sprengelii Centuriam," issued May 30, 1807, were entirely overlooked until discovered by Prof. M. L. Fernald a few years ago. The names that are based on specimens from North America, mostly sent to Sprengel by Muhlenberg, were listed by Fernald in *Rhodora* 47: 198-204 (1945). Among them are seven names of grasses. Bieler's paper was republished unchanged by Sprengel under the title, "Novarum Plantarum ex Herbario Meo Centuria," in the second part of his *Mantiss Prima*, pages 27-28 (1807), evidently later than Bieler's paper. Bieler's name is not mentioned, and the species have been credited to Sprengel and are so listed in the Index Kewensis.

In this edition of the Manual of Grasses, Bieler is given as author of these names, valid and synonyms. They are found in *Festuca*, *Sphenopholis*, *Sporobolus*, and *Panicum*. One name listed by Fernald, "*Panicum pensylvanicum* Bieler, Plant. Nov. Herb. Spreng. Cent. 4. 1807," was published by Sprengel in *Natchrag. Bot. Gart. Halle* 30 (1801), the description reworded in Bieler's paper, but agreeing with the earlier description. This and *Panicum discolor* Bieler, apparently belonging in subgenus *Dichanthelium*, are given in Unidentified Names (p. 982).

It is possible that Sprengel, who was working on grasses, may have written the descriptions of the grasses in Bieler's paper. The century includes many genera in differ-

ent families, from many parts of the world, as well as garden plants and a good many ferns, mosses, and lichens. But since Bieler's paper was published before Sprengel's *Novarum Plantarum*, he is here accepted as author.

ADDENDA

Page 821: Transfer "*Aristida pallens* [Cav. misapplied by] Nutt., Gen. Pl. 1: 57. 1818. Fort Mandan, N. Dak. [Nuttall]" to page 821 and insert after (26) *Aristida longiseta* Steud. 1855. A Pursh specimen from the Lambert Herbarium, in the herbarium of the Academy of Sciences, Philadelphia, named "*Aristida pallens* Cav. ic. 468" and bearing on the back of the sheet in Lambert's script "Louisiana. Bradbury,," was recently examined through the kindness of Prof. J. A. Ewan. It consists of a single flowering culm of *Aristida longiseta* Steud. Many of Bradbury's collections on the Lewis and Clark expedition are marked "Louisiana. Bradbury,," only, "Louisiana" at that time being applied to the trans-Mississippi region. It had been assumed that the collection was made by Nuttall. Nuttall had access to the Pursh Herbarium, later purchased by Lambert, Pursh's patron.

Page 850: ***Danthonia purpurea*** (Thunb.) Beauv. ex Roem. and Schult., Syst. Veg. 2: 690. 1817. Based on *Avena purpurea* Thunb.

Avena purpurea Thunb., Cat. 23. 1794. Cape Good Hope, Africa.

Page 871: *Erianthus giganteus* var. *compactus* Fernald, *Rhodora* 52: 71. 1950. Based on *E. compactus* Nash.

Page 872: *Eriochloa lemmoni* var. *gracilis* Gould, West. Bot. Leaflets 6: 51. 1950. Based on *Helopus gracilis* Fourn.

Page 931: ***Paspalum nicorae*** Parodi, Nat. Mus. La Plata (Bot.) 8: 82. 1943. Based on *P. plicatulum* var. *arenarium* Arech., not *P. arenarium* Schrad., 1824.

Paspalum plicatulum var. *arenarium* Arech., Anal. Mus. Nac. Montevideo 1: 58. 1894. Uruguay.

Page 982: *Elymus pilosus* Muhl., Amer. Phil. Soc. Trans. 3: 161. 1793. Pennsylvania.

Page 983: *Panion buckleyanum* var. *maius* Lunell, Amer. Midl. Nat. 4: 222. 1915. Change of name for "*Poa tenuifolia* var. *maior* (Vasey)," but that name was never published, and no specimen so named by Vasey can be found.

Poa viridis Raf., Med. Repos. 5: 353. 1808. Not *Gilib* 1792.

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[Synonyms are in *italic type*. The page numbers of the principal entries are set in **heavy-face type**]

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